Chapter 5 ENHANCED PLAN

In This Chapter

The Oregon NHMP Enhanced Plan is divided into eight sections:

1. **Introduction:** Provides background on the Oregon Natural Hazards Mitigation Plan and states the purpose of an enhanced plan.
2. **Compliance with Standard Plan:** Establishes compliance with standard plan requirements, a prerequisite for enhanced plans.
3. **Integration with Other Planning Initiatives:** Demonstrates integration, to the extent practicable, of the Oregon NHMP with FEMA and other state or regional initiatives.
4. **Project Implementation Capability:** Details how the State manages natural hazard mitigation projects.
5. **Program Management Capability:** Details how the State manages natural hazard mitigation programs.
6. **Mitigation Action Assessment:** Explains how the state evaluates the effectiveness of completed mitigation projects.
7. **Effective Use of Available Mitigation Funding:** Demonstrates that the State uses the mitigation funding it receives through FEMA programs to achieve its mitigation goals.
8. **Commitment to a Comprehensive Mitigation Program:** Demonstrates the State's commitment to a comprehensive natural hazard mitigation program by describing different facets of the program, areas of progress, and how the State continually strives to improve the program.

5.1 Introduction

Requirement 44 CFR §201.5, Enhanced State Mitigation Plans. (a) A State with a FEMA approved Enhanced State Mitigation Plan at the time of a disaster declaration is eligible to receive increased funds under the HMGP, based on twenty percent of the total estimated eligible Stafford Act disaster assistance. The Enhanced State Mitigation Plan must demonstrate that a State has developed a comprehensive mitigation program, that the State effectively uses available mitigation funding, and that it is capable of managing the increased funding. In order for the State to be eligible for the 20 percent HMGP funding, FEMA must have approved the plan within three years prior to the disaster declaration.

Oregon's first DMA2K compliant plan—a 44 CFR §201.5 Standard Plan—was approved by the Federal Emergency Management Agency (FEMA) in October 2004. The state's first Enhanced Plan was approved in 2006 and updated in 2009. While an Enhanced Plan was submitted for FEMA's consideration in 2012, FEMA approved the plan as a Standard Plan because of a lack of program management capacity.

In May 2014, the federal mitigation planning rules were revised to extend the life of state mitigation plans from three to five years. By letter dated May 27, 2014, FEMA notified the Governor that the 2012 Oregon Natural Hazards Mitigation Plan's approval would remain effective through March 4, 2017. This extension presented an opportunity for the state to pursue re-approval of the 2012 Oregon NHMP as an enhanced plan. After a concerted and lengthy effort to improve program management, Oregon met the criteria for reconsideration and with the support of FEMA Region X began the enhanced plan approval process. On February 27, 2015, FEMA re-approved the 2012 Oregon NHMP as an enhanced plan.

Enhanced plan approval constitutes FEMA's recognition that a state has demonstrated its commitment to maintaining a comprehensive natural hazard mitigation program and supporting that commitment through skilled and effective management of mitigation funding, projects, and planning; support of local mitigation plans and projects; integration of mitigation plans and projects with other state and federal plans, programs, and initiatives; and continual progress in implementation. This exceptional level of effort and demonstration of excellence yields dividends in the form of increased federal mitigation funding after disaster strikes.

The purpose of this chapter is to demonstrate that the 2015 Oregon Natural Hazards Mitigation Plan meets all the Enhanced State Mitigation Plan requirements set forth in 44 CFR 201.5 (See the Enhanced State Hazard Mitigation Plan Review Crosswalk dated [XXX] 2015 in **Appendix 9.4.18**).

5.2 Compliance with Standard Plan

The 2015 Oregon Natural Hazards Mitigation Plan meets all the Standard State Mitigation Plan requirements as set forth in 44 CFR 201.4 and documented in the Standard State Hazard Mitigation Plan Review Crosswalk dated [XXX], 2015 (**Appendix 9.4.17**).

5.3 Integration with Other Planning Initiatives

Requirement 44 CFR §201.5(b)(1), Demonstration that the plan is integrated to the extent practicable with other State and/or regional planning initiatives (comprehensive, growth management, economic development, capital improvement, land development, and/or emergency management plans) and FEMA mitigation programs and initiatives that provide guidance to State and regional agencies.

Goals and strategies outlined in the Oregon NHMP are integrated to the extent practicable with other state, regional, and FEMA initiatives that provide primary guidance for hazard mitigation-related activities. The Oregon Military Department, Office of Emergency Management works closely with other agencies, organizations, and individuals to ensure that activities, programs, and plans are integrated to the greatest extent possible to incorporate hazard mitigation wherever possible and practicable. In a few instances (e.g., statewide land use planning goals, tsunami inundation mapping), the state has influenced the incorporation of hazard mitigation into existing programs, regulations, and activities as well.

The Oregon NHMP is one component of the first volume of the State Emergency Management Plan, administered by the Oregon Military Department's Office of Emergency Management.

Figure 1-1 illustrates this organizational relationship. Relationships with other state and federal plans and programs are also noted in the Mitigation Action Tables, **Table 3-1** and **Table 3-2**.

The 2015 Oregon NHMP goals are:

1. Protect life and reduce injuries resulting from natural hazards.
2. Minimize public and private property damages and the disruption of essential infrastructure and services from natural hazards.
3. Increase the resilience of local, regional, and statewide economies.
4. Minimize the impact of natural hazards while protecting, restoring, and sustaining environmental processes.
5. Enhance and maintain state capability to implement a comprehensive statewide hazard loss reduction strategy.
6. Document and evaluate Oregon's progress in achieving hazard mitigation.
7. Motivate the public, private sector, and government agencies to mitigate against the effects of natural hazards through information and education.
8. Eliminate development within mapped hazardous areas where the risks to people and property cannot be mitigated.
9. Minimize damage to historic and cultural resources.
10. Increase communication, collaboration, and coordination among agencies at all levels of government and the private sector to mitigate natural hazards.
11. Integrate local NHMPs with comprehensive plans and implementing measures.

Table 5-1 shows the major, though not all, programs and plans that integrate the goals with state and regional initiatives. While this is not a comprehensive list, it does illustrate the key programs and plans that show the integration of NHMP goals.

Table 5-1. Integration of Oregon NHMP Goals with Other Initiatives

Lead Agency or Organization	Name of Plan or Program	Satisfies Mitigation Goals	Description
OEM	quarterly mitigation coordination calls with FEMA	1–11	Updates on planning, grant offerings, policy and regulations. This coordination generally occurs the week before the regularly scheduled quarterly meetings of the State IHMT and provides current information for the State IHMT.
OEM and FEMA	**Appendix 9.3.1, Hazard Mitigation Grant Program: DR-4169 Administrative Plan**	1–11	This plan provides policy and guidelines for administering hazard mitigation grants. It complies with the Stafford Act and the Sandy Recovery Improvement Act. It has been updated since the last state mitigation plan was approved by FEMA in 2012 to include major disaster declarations DR-4055 and DR-4169.
OEM and FEMA	Public Assistance Program	1-11	Funds restoration of eligible public facilities damaged by a Presidentially-declared disaster. Mitigation may be completed simultaneously with restoration.
OEM and FEMA	Hazard Mitigation Grant Program	1-11	Funds post-disaster mitigation projects damaged by a Presidentially-declard disaster. Undamaged parts of a facility may be eligible for funding under the Public Assistance Program
OEM and FEMA	Flood Mitigation Assistance Program	1-11	Funds used primarily for elevations and acquisitions with focus on repetitive and severe repetitive loss properties.
OEM, FEMA, OPDR, DLCD	Pre-Disaster Mitigation	1-11	Funds used primarily for assisting local jurisdictions with developing new and updating existing local natural hazard mitigation programs.
OEM, FEMA, DLCD, DCBS-BCD	National Flood Insurance Program	1-11	DLCD serves as the state NFIP coordinating agency, partnering with DCBS-BCD and OEM. The NFIP is designed to help minimize flood losses through local floodplain management. The NFIP relies on flood hazard mapping, flood insurance, and floodplain development standards implemented at the local level to reduce flood losses.
OEM	Oregon Local Disaster Assistance Loan and Grant Account (ORS 401.536)	1–6, 9	Appropriated per biennium by the legislature, the Oregon Local Disaster Assistance and Loan and Grant Account provides loans and grants to local governments and school districts to cover any required cost share in full or in part. Funds may also be used for non-federally declared disasters, and to help pay for administration of loans.
OEM, Colleges and Universities	Community College and University Campus Mitigation Plans	1-11	This initiative encourages universities and colleges throughout the country to identify their risks and assess their vulnerability to natural and man-made hazards, and to develop a hazard mitigation plan.
OSSPAC	**Appendix 9.2.5, Oregon Resilience Plan**	1–3, 5–7, 9, 11	This plan reviews policy options, summarizes relevant reports and studies by state agencies, and makes recommendations on policy direction to protect lives and keep commerce flowing during and after a Cascadia Subduction Zone earthquake and tsunami.

Lead Agency or Organization	Name of Plan or Program	Satisfies Mitigation Goals	Description
DLCD	North Coast Resilience Project	1–4, 7-11	This project is a collaborative effort of DLCD, OPDR, and Oregon Sea Grant, and the communiteis of Gearhart, Seaside, Cannon Beach, and Clatsop County with funding from NOAA. The purpose of the project is to provide information about community resilience and a structured approach that can be used by other communities to improve their resilience to disturbances like natural hazards.
DLCD	Oregon Statewide Planning Goal 7: Areas Subject to Natural Hazards	1–5, 7–9, 11	This statewide land use planning goal requires all local city and county comprehensive plans to include measures to reduce the risk to people and property from natural hazards. DLCD has developed a guide for land use planning to mitigate damage from tsunamis and is actively working with coastal communities to implement it. DLCD is also encouraging local communities to integrate the hazard information and mitigation actions contained in their NHMPs with the Goal 7 inventories, policies, and implementation measures contained in their comprehensive plans. DLCD works with communities to use new hazard information to enhance mitigation.
DLCD	Oregon Risk MAP	1–11	This website is a hub for information about natural hazards. At this time it is primarily focused on flooding and floodplain mapping issues and projects, with plans to gradually address other natural hazards. Risk MAP is a collaborative program coordinated by DLCD and involving FEMA, other state agencies, local governments, and the public..
DOGAMI	Lidar-Based Risk Assessment Initiative	1–2, 4–5, 7–8, 10–11	This initiative provides high-resolution digital elevation mapping (lidar) so that Oregon communities can better understand their risks from floods, landslides, earthquakes, and wildfires. The consortium enables State acquisition of more lidar than it would otherwise be able to afford.
ODOT	Seismic Lifelines Evaluation, Vulnerability Synthesis, and Identification (2012)	1–3, 5–7	This report documents the process conducted and conclusions reached in the Oregon Seismic Lifelines Route identification (OSLR) project. It identifies a specific list of highways and bridges recommended to comprise the seismic lifeline system, and establishes a three-tiered system of lifeline corridors to help prioritize seismic retrofits on State-owned highways and bridges.
ODOT	**Appendix 9.1.12, Statewide Loss Estimates: Oregon Highways Seismic Options Report** (2013)	1–3, 5–7	This report assesses the risk of a major seismic event to highway facilities in Oregon and outlines options for phased retrofitting.
State IHMT	Oregon Silver Jackets Team	1–7, 10	The Silver Jackets Team is a subcommittee of the State Interagency Hazard Mitigation Team. It establishes and strengthens intergovernmental partnerships to better develop solutions to state flood hazard challenges.
Oregon Climate Change Research Institute (OSU)	**Appendix 9.1.19, Oregon Climate Change Adaptation Framework** (2010)	1–5, 7	The Framework identifies risks and subsequent measures to reduce Oregon's vulnerability to the effects of climate change.

Lead Agency or Organization	Name of Plan or Program	Satisfies Mitigation Goals	Description
Business Oregon	State Seismic Rehabilitation Grant Program (ongoing)	1-2, 5	This grant program, administered by the Infrastructure Finance Authority of Business Oregon, provides state funds to rehabilitate critical public buildings, particularly schools and emergency service facilities.
Business Oregon	HUD Disaster Resilience Competition (2014–2017)	1–9	Nearly $1 billion will be available nationally through HUD's Community Development Block Grant-Disaster Recovery fund. It will fund projects to help communities rebuild from a declared disaster and increase their resilience to future disasters. With FEMA's update and release of the HMA Program Guidance for FY2015, Climate Change and resilience must now be considered for FEMA mitigation project funding.
Oregon Water Resources Department	Integrated Water Resources Strategy (2012)	2–4, 6-7	This plan increases the understanding of Oregon's water needs and identifies strategies to meet them. As water resource issues are often also natural hazard issues (e.g., flood, drought, landslide, wildfire), some of the strategies are also mitigation actions.

Source: Oregon Office of Emergency Management.

More detailed descriptions of several of the items listed in **Table 5-1** and others follow, illustrating how plans and programs integrate the goals of the NHMP.

- **Community College and University Campus Mitigation Plans.** In 2003, FEMA initiated its Disaster-Resistant University Initiative. Given the importance of colleges and universities to the economy and future success of the country, the initiative is an important investment in our institutions of higher education. This initiative encourages universities and colleges throughout the country to identify their risks and assess their vulnerability to natural and man-made hazards, and to develop a hazard mitigation plan.

  The guidance for colleges and universities is similar to that provided to local communities. Currently, seven Oregon community colleges and universities—Eastern Oregon University, Linn-Benton Community College, Mount Hood Community College, Oregon Tech, Southern Oregon University, University of Oregon, and Western Oregon University all have approved mitigation plans, while Oregon State University is initiating development of a campus-wide (multi-location) hazard mitigation plan.

- **North Coast Resilience Project.** In 2013, DLCD's Oregon Coastal Management Program received a grant from NOAA to conduct a pilot project focused on improving community resilience to natural hazards, including hazards related to climate change. The project was led jointly by DLCD, OPDR, and Oregon Sea Grant with several other state agencies providing support throughout the project. Four communities participated: Clatsop County, Gearhart, Seaside, and Cannon Beach. Through the project, the agencies and communities developed an approach to planning for community resilience at the local level and established a network of people, organizations, and communities to improve community resilience to coastal hazards.

- **City of Madras Natural Hazards Mitigation Plan Integration.** The University of Oregon's Community Planning Workshop completed a successful pilot project assisting the City of Madras with integrating its NHMP into its Comprehensive Plan. FEMA's new Whole Community concept is oriented toward integration of the NHMP into the Comp Plan: "A Whole Community approach to building community resilience requires finding ways to support and strengthen the institutions, assets, and networks that already work well in communities." Through this successful pilot project, the Goal 7 section of Madras's Comprehensive Plan was updated and integrated with its recently updated and FEMA-approved NHMP, supporting one another more effectively. The project team also created educational materials to help residents of Madras understand the NHMP, the Comprehensive Plan, and what their integration means.

- **Portland Lidar Consortium.** Coordinated by DOGAMI, the Portland Lidar Consortium is a group of federal, state, and local governments that are working together to fund lidar mapping for portions (or all) of Clatsop, Tillamook, Washington, Clackamas, Multnomah, Hood River, Marion, and Yamhill Counties. Seventeen agencies have worked together to map 2,200 square miles of lidar data. This coordination reduced the cost of collecting the data, and increased the quality and standardization of the data acquired.

  Based in part on the success of the Portland Lidar Consortium, the Oregon Legislature provided some funding and directed DOGAMI to expand lidar collection efforts to other parts of the state in 2007. The state continues to work with local governments and other organizations to expand lidar mapping efforts.

- **Oregon Silver Jackets Team.** The Oregon Silver Jackets Team is a subcommittee of the State Interagency Hazard Mitigation Team dedicated to improving state intergovernmental partnerships focused on developing comprehensive and sustainable solutions to state flood hazard challenges. The team includes
  - Oregon Department of Land, Conservation, and Development
  - Oregon Office of Emergency Management
  - US Army Corps of Engineers Portland District
  - Federal Emergency Management Agency Region X
  - Oregon Department of Geology and Mineral Industries
  - National Weather Service's Northwest River Forecast Center
  - US Geological Survey

  The Oregon Silver Jackets Team's goals are aligned with those of the 2015 Oregon NHMP, including development of strategies to reduce the threat, vulnerability, and consequences of flooding in Oregon; increase communication and capacity of state government to solve issues related to flooding, thus improve the capacity of local governments to reduce loss; increase and improve flood risk communication and outreach helping to motivate others to mitigate through information and education; and much more.

- **Statewide Planning Goals.** DLCD is the State's land use planning agency and is responsible for implementing 19 Statewide Planning Goals, including Goal 7, Areas Subject to Natural Hazards, which requires comprehensive plans and implementing measures to reduce risk to people and property from natural hazards. The State and FEMA's share this goal. With its added natural hazard planning capacity, DLCD has been able to begin encouraging and assisting local governments with integrating their NHMPs and comprehensive plans. In January 2014, DLCD released its guidance document, "Preparing for a Cascadia Subduction Zone Tsunami: A Land

Use Guide for Oregon Coastal Communities" and is actively assisting coastal communities with tsunami mitigation planning.

- **Community Wildfire Protection Plans.** The Oregon Department of Forestry (ODF) produces data on wildfire hazards throughout the State. It also works with communities on Community Wildfire Protection Plans (CWPPs) which often are used as the wildfire hazard section of local NHMPs. Both are updated on five-year cycles and ODF, OPDR, OEM, and DLCD are interested in instituting this integration, and fostering integration with comprehensive plans.

- **Climate Change.** Oregon is competing for a portion of nearly $1 billion available nationally through HUD's Community Development Block Grant-Disaster Recovery fund to cover unmet needs from previous declared disasters. If secured, it would fund projects to help communities rebuild and increase their resilience to future disasters. With FEMA's update and release of the HMA Program Guidance for FY2015, Climate Change & Resilience must now be considered for incorporation into FEMA mitigation project funding in the following ways:
    - The Guidance encourages communities to become more resilient and to incorporate climate change considerations in their project scoping and development.
    - The benefit-cost analysis allows for the incorporation of additional benefits into the calculations, such as the benefits of sea level rise mitigation, and environmental benefits associated with the acquisition of properties in green open space and riparian areas.
    - Applicants and sub-applicants can utilize the HMGP Five Percent Initiative to incorporate disaster-resistant building codes.
    - The Guidance promotes the inclusion of mitigation strategies that foster community resilience and smart development growth within mitigation plans."

  DLCD has a lead role in planning for climate change in Oregon, and along with OCCRI and OCS has brought expertise and the Oregon Climate Change Adaptation Framework into the NHMP planning process.

- **NFIP and Risk MAP.** DLCD houses the State NFIP Coordinator and the State Risk MAP Coordinator. Together, DLCD and FEMA sponsor robust NFIP Implementation and Risk MAP Programs. The NFIP Implementation Program provides in-depth technical assistance to local governments, property owners, other stakeholder and interest groups and coordinates with the State Hazard Mitigation Officer to sustain an active program of mitigating repetitive loss, severe repetitive loss, and substantially damaged properties. In 2014, the NFIP Implementation Program initiated two Community Rating System (CRS) Users' Groups to provide a forum for CRS communities and those contemplating joining the CRS Program to share information and expertise and ultimately increase participation throughout the State. The State NFIP Coordinator was called upon to testify before the Senate Banking Committee on the Biggert-Waters Flood Insurance Reform Act of 2012 and is currently serving Oregon and the United States as a member of FEMA's Technical Mapping Advisory Council. The State NFIP Coordinator works closely with the State Risk MAP Coordinator on flood hazard identification and mitigation studies, levee certification, and other issues. The State Risk MAP Coordinator also works closely with FEMA to plan and prioritize Oregon Risk MAP activities; with DOGAMI on developing and analyzing multi-hazard data and making it accessible to local governments through the Risk MAP Program; and with OPDR on helping communities understand and implement Risk MAP studies.

- **Geologic Hazards.** DOGAMI is the source of much of Oregon's hazard data, conducting research in coastal hazards, earthquakes and related hazards, floods, landslides, volcanic hazards, and tsunamis. DOGAMI works closely with DLCD, OPDR, and other entities to apply its research and help prevent and mitigate potential losses from natural hazards.

- **Seismic Rehabilitation Grant Program.** Business Oregon's Infrastructure Finance Division administers the Oregon Seismic Rehabilitation Grant Program (SRGP) which provides state funds for seismic rehabilitation of critical public buildings, particularly public schools (K-12, community colleges, education service districts, and universities) and emergency services facilities (hospital buildings with acute inpatient care facilities, fire stations, police stations, sheriff's offices, 9-1-1 centers and Emergency Operations Centers).

- **Health, Security, Preparedness, and Response.** The Oregon Health Authority's Health Security, Preparedness and Response (HSPR) Program develops public health systems to prepare for and respond to major, acute threats and emergencies that impact the health of people in Oregon. The Program addresses eight of Oregon's 11 natural hazards, plus extreme heat and bioterrorism.

- **Oregon Office of Emergency Management.** OEM is the hub of emergency planning for the State of Oregon. It houses the State Hazard Mitigation Officer, supports the State IHMT, and is responsible for all stages of the disaster cycle—mitigation, preparation, response, and recovery—for human-caused hazards as well as natural hazards. The 2015 Natural Hazards Mitigation Plan constitutes Volume 1 of the Oregon Emergency Operations Plan with which all other emergency plans are coordinated.

- **Emergency Management Performance Grants Program.** OEM also administers the Emergency Management Performance Grants Program (EMPG) which passes through funding from FEMA to state, local, tribal and territorial governments for preparing for all hazards. One requirement for local and tribal governments to obtain this funding is to have a current, FEMA-approved NHMP.

5.4 Project Implementation Capability

Requirement 44 CFR §201.5(b)(2), Documentation of the State's project implementation capability, identifying and demonstrating the ability to implement the plan, including:

Requirement 44 CFR §201.5(b)(2)(i), Established eligibility criteria for multi-hazard mitigation measures.

Requirement 44 CFR §201.5(b)(2)(ii), A system to determine the cost effectiveness of mitigation measures, consistent with OMB Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, and to rank the measures according to the State's eligibility criteria.

FEMA's Hazard Mitigation Assistance Program (HMA) encompasses three of the programs upon which the State of Oregon relies to fund natural hazards mitigation planning and projects: Pre-Disaster Mitigation (PDM), Flood Mitigation Assistance Program (FMA), and the post-disaster Hazard Mitigation Grant Program (HMGP). The State of Oregon complies with funding criteria outlined in the Unified Hazard Mitigation Assistance Guidancedeveloped and updated by FEMA. In addition, the State complies with FEMA requirements for the Benefit-Cost Analysis used to evaluate all mitigation project applications as well as environmental and historic preservation review processes. Mitigation project feasibility, benefit-cost analysis, and environmental and historic review are all critical paths when considering potential mitigation project eligibility for FEMA funding. Although not specifically a mitigation grant program, there is a mitigation component to FEMA's Public Assistance program that allows for cost-effective integration of mitigation during the repair and restoration of public infrastructure following a Presidential disaster declaration.

5.4.1 Established Eligibility Criteria & Ranking System for Multi-Hazard Mitigation Measures

5.4.1.1 Eligibility Criteria

Proposed hazard mitigation projects, including those proposed under Section 404 of the Stafford Act, are evaluated for FEMA funding eligibility on the basis of the following federal and State criteria:

1. Be consistent with, support, and help implement the goals and objectives of the state's natural hazards mitigation plan developed under Sections (standard plan) 201.4 or (enhanced plan) 201.5 of the Stafford Act;
2. Be consistent with, support, and help implement the goals, objectives, and mitigation actions of local hazard mitigation plans in place for the geographic area in question developed under Section 201.6 of the Stafford Act;
3. Have significant potential to reduce damages to public and/or private property to reduce the cost of recovering from future disasters;
4. Be the most practical, cost-effective, and environmentally sound alternative after a consideration of a range of alternatives;
5. For federally-funded projects, meet federal requirements for benefit-cost requirements by having a benefit-cost ratio ≥ 1.0;
6. Address a repetitive loss or substantial damage problem, or one that has the potential to have a major impact on an area, reducing the potential for loss of life, loss of essential services or personal property, damage to critical facilities, economic loss, hardship, or suffering;
7. Solve a problem independently, or constitute a portion of a solution where there is a likelihood that the project as a whole will be completed;
8. Conform with 44 CFR Part 9, Floodplain Management and Protection of Wetlands, and not contribute to or encourage development in wetlands or in floodplains;
9. Conform with 44 CFR Part 10, Environmental Considerations;
10. Be based on a hazard vulnerability analysis of the geographic area in question;
11. Be feasible (both technically and within an approved scope-of-work and budget) and be ready to proceed when approved and funded;
12. Meet applicable permit requirements;
13. Not encourage new development in hazardous areas;
14. Contribute to a permanent or long-term solution to the problem, and have manageable maintenance and modification costs;
15. Whenever possible, be designed to accomplish multiple objectives, including damage reduction, environmental enhancement, and economic development or recovery; and
16. Whenever possible, utilize existing agencies or programs to implement the project.

Mitigation of repetitive loss properties (those with an NFIP insurance history of flood losses) have been identified by FEMA as a top priority for mitigation by elevation, relocation or acquisition. FEMA preferentially supports these properties for mitigation funding through the NFIP - ICC claims process, benefit/cost waiver for substantial damage by flooding, and by baseline cost effectiveness determinations that expedite project identification, selection and approval. NFIP loss data report that one third of all NFIP flood loss claims can be attributed to repetitive loss properties. In Oregon, the repetitive (and severe repetitive) loss list of NFIP –insured properties represents generally straightforward, achievable mitigation projects. When identified prior to the next flood loss and,

particularly, if substantially damaged by flooding, these properties are Oregon's top priority for flood mitigation.

5.4.1.2 Ranking System

Oregon implements a pre-application process through which information used to determine eligibility is collected. Eligible projects are ranked based on the policy framework developed by the State Interagency Hazard Mitigation Team to ensure that post-disaster implementation strategies accomplish those projects that address repetitive losses, are the most cost-effective and have the potential to quickly demonstrate success by reducing future disaster losses. In addition, communities with FEMA-approved, current 44 CFR Section 201.6 natural hazards mitigation plans will have top priority status and projects identified in these communities can generally be selected and approved quickly if they meet the benefit-cost requirements and have minimal environmental issues. For flood losses, homeowners that sustain substantially damaged homes (whether insured through the NFIP or not) present high priority mitigation opportunities as well in any Presidentially-declared disaster or in any wet winter in Oregon.

When convened (generally only for larger disaster declarations), the

Hazard Mitigation Grant Review Board reviews, ranks, and determines which project applications are selected for FEMA's funding consideration. FEMA reviews, considers and approves (or not) all FEMA-funded mitigation projects submitted by the state. Projects are first reviewed to determine if they meet all of the criteria (or could with minimal additional effort). Any projects that do not meet the eligibility criteria are set aside and not considered for funding. Eligible projects are then ranked based on priorities identified through the disaster-specific FEMA-State Hazard Mitigation Strategy report, State, and local hazard mitigation plans, and policy/direction from the State Interagency Hazard Mitigation Team. If there are more projects than dollars, the Board will select the most highly ranked projects up to 90% of the limit of the Federal Hazard Mitigation Grant Program (HMGP) lock-in. In addition, the Board may also consider the level of interest and commitment shown by sub-applicant to hazard mitigation activities and programs. Past success in mitigation does carry considerable weight when evaluating equal projects.

5.4.2 Benefit-Cost Analysis of Natural Hazard Mitigation Projects

Mitigation activities reduce the cost of disasters by minimizing property damage, injuries, and the potential for loss of life, and by reducing emergency response costs which would otherwise be incurred. Other mitigation benefits include those of an economic nature such as maintaining utility services (for example electricity and water) when there is a loss of function as a result of the disaster. Evaluating possible natural hazard mitigation activities provides decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects. An objective benefit-cost analysis is a tool used to determine mitigation project eligibility when Federal funds come into play.

The FEMA Benefit-Cost Analysis (BCA) software program is used to determine the cost effectiveness of proposed mitigation projects for FEMA's mitigation grant programs. The basis for BCA when federal funding is used to implement mitigation measures is found in OMB Circular A-94: "The goal of Circular A-94 is to promote efficient resource allocation through well-informed decision-making by the Federal Government. It provides general guidance for conducting benefit-cost and cost-effectiveness analyses. It also provides specific guidance on the discount rates to be used in evaluating Federal programs whose benefits and costs are distributed over time. The general guidance will serve as a checklist of whether an agency has considered and properly dealt with all the elements for sound benefit-cost and cost-effectiveness analyses." In 2008, FEMA collaborated with many applicants and sub-applicants on enhancements to calculations, methodologies, and the software's efficiency. The FEMA BCA tool, much like any other software tool, is subject to review, revisions, and improvement.

FEMA's BCA Reference Guide explains the current BCA tool (Version 5.0 released in April 2014) and provides BCA software users with an overview of the grant programs, application development, benefits and costs, the location of BCA guidance documents, and helpful information.

FEMA's BCA program is a key mechanism for evaluating certain hazard mitigation projects to determine eligibility and assist in Federal funding decisions. The FEMA BCA program is comprised of methodologies and software for a range of major natural hazards. To be eligible for Federal funding assistance, a BCA must show that the project is cost-effective and will reduce future damages and losses from natural disasters. Reduction in losses or prevention of future damages is the benefit of the project.

Cost, as it relates to mitigation, is the price to develop, implement, and maintain a mitigation project. The project cost estimate, as used in the FEMA mitigation grant guidance, includes all costs associated

with the proposed mitigation project, and represents the best-estimated costs for the activity. Estimates are required for the following cost item categories:

- Anticipated cash and in-kind federal match
- Equipment
- Labor
- Materials
- Subcontract Costs
- Other costs are those that do not fall neatly into one of these categories, but must be delineated in the BCA if applicable to the project.

The FEMA BCA tool utilizes a six-step cost-estimating methodology:

- Step 1: Develop an estimate of pre-construction or non-construction costs.
- Step 2: Develop an estimate of construction costs.
- Step 3: Develop an estimate of ancillary costs.
- Step 4: Develop an estimate of annual maintenance costs.
- Step 5: Adjust the estimate to account for project timing and whether the data is current.
- Step 6: Review and confirm the cost estimate.

FEMA has developed procedures and techniques to help sub-applicants use its BCA tool and develop thorough grant applications.

Since the last update and promulgation of this Plan in 2012, FEMA has continued to revise its BCA policies. For certain project categories, such as the acquisition of substantially damaged homes in the floodplain, FEMA allows for exceptions to a rigorous benefit-cost analysis. This exception and others are explained on a case-by-case basis in the Unified Hazard Mitigation Assistance program guidance.

Two notable new BCA policies (2013) are the Environmental Benefits Policy and the Baseline Policy. The Environmental Benefits Policy allows for incorporation of environmental benefits of acquisition projects under the HMA grant programs. The policy states that environmental benefits can be included for each structure when the project benefit-cost ratio (BCR) reaches 0.75. With an incremental addition of a BCR of up to 0.25 for environmental benefits, a project that was not cost effective with a BCR of 0.75 becomes cost effective with a BCR of 1.0.

The Baseline Policy is a formula for pre-calculated benefits to determine cost effectiveness of elevations and acquisitions in Special Flood Hazard Areas. FEMA has determined in a policy dated October 3, 2013, that the acquisition or elevation of a structure located in the 100-year floodplain as delineated on the Flood Insurance Rate Map (FIRM) or best available data is considered cost effective if it costs less than or equal to:

- Property Acquisition: $276,000
- Property Elevation: $175,000

For those properties that have a history of repetitive flood losses or are substantially damaged by flooding, this “baseline” policy provides yet another opportunity to identify and streamline the implementation of priority mitigation projects.

5.4.2.1 Oregon Seismic Rehabilitation Grant Program: Oregon BCA Tool

Because Federal funding is not incorporated into the state-funded seismic retrofit program, the state is not obligated to use either the FEMA-prescribed BCA software or explicitly meet the requirements of OMB Circular A-94. However, standard methodologies and refinements to the FEMA BCA software provided a basis for the development of the Oregon BCA Tool.

The Oregon Office of Emergency Management created the Oregon BCA Tool for use by local jurisdictions when applying for state-sponsored mitigation funding through OEM programs such as the Seismic Rehabilitation Grant Program (SRGP). The Oregon BCA Tool uses detailed, USGS data specific to Oregon. The SRGP-based BCA tool was developed using methodologies from the FEMA BCA Tool at the time but with an emphasis on being tailored for Oregon projects (seismology, soil conditions, and building types) and an improved user interface. DOGAMI completed a Statewide Seismic Needs Assessment in June 2007, a key component in developing the Oregon SRGP BCA Tool. This assessment of school buildings and public safety facilities included a rapid visual screening (RVS) of such buildings and a ranking of these screenings based on need and risk. With the legislative authority to develop and implement the Oregon SRGP in 2009, BCA's were required to be performed as prescribed by OEM. A draft Oregon BCA Tool was completed in October 2009 and a finalized public version released in June 2010, which was the first year the applications were solicited and funded. Seismic benefits calculated by FEMA's most current BCA tool (4.8 and now 5.0) still seem to be undervalued, making it difficult for most seismic mitigation projects to meet the Federal BCA eligibility test. The SRGP will continue to use the Oregon-specific BCA tool for seismic projects.

For the Oregon Seismic Rehabilitation Grant Program, the following categories of damages and losses are considered:

- Building damages
- Contents damages
- Displacement costs for temporary quarters
- Loss of public services
- Casualties (deaths and injuries)

Benefit-cost analysis requires several types of input data, which requires quantitative assessments of the following factors:

- Level of seismic hazard at the building's location
- Vulnerability of the building and contents to damage in future earthquakes
- Values of the building and contents
- Costs for temporary quarters if the building must be vacated for repair of future earthquake damage
- Value and importance of the public services provided from the building
- Number of occupants in the building

To compare future benefits with the present costs of seismic retrofits, the calculated future benefits of retrofitting are adjusted to net present value, taking into account the time value of money. These calculations are done automatically by the Oregon BCA Tool, based on standardized assumptions about the useful lifetime of the project and the "discount rate" which reflects the time value of money.

For benefit-cost analyses of seismic mitigation projects for the Oregon Seismic Rehabilitation Grant Program, a standard useful lifetime of 50-years and a discount rate of 2% are built into the Oregon BCA Tool. The Oregon BCA Tool does all of the many complicated calculations necessary for benefit-cost analysis automatically. The user must only enter the specified building-specific information in the designated cells in the spreadsheet.

For the Oregon Seismic Rehabilitation Grant Program, benefit-cost results are an important part of the evaluation and ranking process, but are not the sole determinant of whether or not a given project will be selected for funding. In some cases where other non-BCA factors are more important in final project selection, projects with benefit-cost ratios below 1.0 may be considered for funding.

5.4.3 Program Management Capability

Requirement 44 CFR §201.5(b)(2)(iii), Demonstration that the State has the capability to effectively manage the HMGP as well as other mitigation grant programs, including a record of the following:

(A) Meeting HMGP and other mitigation grant application timeframes and submitting complete, technically feasible, and eligible project applications with appropriate supporting documentation;

(B) Preparing and submitting accurate environmental reviews and benefit-cost analyses;

(C) Submitting complete and accurate quarterly progress and financial reports on time; and

(D) Completing HMGP and other mitigation grant projects within established performance periods, including financial reconciliation.

All program management is handled by the Oregon Office of Emergency Management, often in collaboration with staff at other agencies and organizations. Table 5-2 lists the primary committees and staff that are responsible for implementing and monitoring mitigation activities and projects as well as ensuring these activities achieve the goals of the Mitigation Strategy.

Table 5-2. Primary Committee and Staff Responsible for Monitoring Mitigation Activities and Programs

Lead Agency	Committee or Staff Title	Mitigation Management Role
OEM	State Interagency Hazard Mitigation Team (State-IHMT)	Develops policy framework for the State's pre- and post-disaster mitigation efforts. This policy framework is necessary to ensure that the post- disaster mitigation implementation strategies will effectively focus upon accomplishing the highest quality and most cost-effective projects. This policy framework is the cornerstone for the State's Hazard Mitigation Grant Program (Section 404 of the Stafford Act) and is articulated in the Oregon Natural Hazards Mitigation Plan. The State IHMT may also act as the Hazard Mitigation Grant Review Board for smaller disasters.
OEM	Hazard Mitigation Grant Review Board	Reviews, sets priorities, and selects projects for Hazard Mitigation Grant Program funding (Section 404 of the Stafford Act) for large, Presidentially-declared disasters. The Board acts to ensure consistency between the projects submitted and the policies and strategies promulgated by the State-IHMT including the *State Natural Hazards Mitigation Plan*. For smaller disaster declarations (such as DR-4169), discussions with the Hazard Mitigation Grant Review Board generally occur outside of formal meetings using mitigation priorities identified in the state and local mitigation plans as a basis for identifying HMGP project opportunities for further development.
OEM	State Coordinating Officer	The person appointed by the Governor to act in cooperation with the appointed Federal Coordinating Officer as key State staff on the delivery of disaster assistance programs.
OEM	Mitigation and Recovery Services Section	The purpose of this section is to provide oversight and administration of OEM´s financial services and related funding that is passed-through to local government, and to manage disaster recovery activities for state and local governments in the event of a devastating emergency or disaster.

Lead Agency	Committee or Staff Title	Mitigation Management Role
OEM	State Hazard Mitigation Officer (SHMO)	Official representative of State government who is the primary point of contact with FEMA, other federal agencies, state agencies, and local governments in mitigation planning and implementation of mitigation programs and activities required under the Stafford Act. The SHMO chairs the State IHMT, staffs the Hazard Mitigation Grant Review Board, oversees and coodinates FEMA-funded mitigation projects and planning grants. The SHMO position is expected to be filled on a full-time basis to provide continuity between major disaster declarations and to implement the state's mitigation plan.
OEM	Emergency Management Specialist and Special Projects Coordinator	Work with the SHMO on matters relating to Section 404 grant program, 406 mitigation and natural hazards mitigation planning activities.
OEM	Facilities Engineer—State Public Assistance Officer	Assists in reviewing project applications, providing technical assistance to sub-applicants and subgrantees, substantiating costs, and conducting project inspections. The Special Projects Coordinator works closely with the Facilities Engineer and SHMO.
OEM	Grant Program Accountants (2)	Responsible for reviewing reimbursement expenses, determining eligible costs, issuing payments, and taking a supporting role in closing completed projects.
OEM	Fiscal Coordinator	Assists the State staff by performing administrative and accounting work in the Public Assistance and Hazard Mitigation Grant programs.
OEM	Disaster Response Staff	Due to post-disaster activities and requirements, or the size of the disaster, the State may appoint or hire additional staff to assist the State Hazard Mitigation Officer in managing the grant program. The State will submit an initial hazard mitigation staffing pattern to FEMA generally within 10 days of the opening of the Joint Field Office (JFO). The staffing requirements associated with grant program activities serve as the basis for determining State Management Costs.
OEM 2015 Legislature Policy Options Package	Requested: Two Program Analyst 2s	This Policy Options Package would establish two (2) new positions as well as services and supplies to help manage projects and provide direct, tailored, technical assistance to city, county, and tribal governments as it relates to Oregon's Hazard Mitigation Program.
DLCD	National Flood Insurance Program Coordinator	44 CFR 60.25 encourages states to demonstrate a commitment to the minimum floodplain management criteria under the NFIP by designating an agency of State government to be responsible for the coordination of floodplain management throughout the state.
DLCD	State Risk MAP Coordinator	DLCD is the State Coordinating Agency for Risk MAP charged with the delivery of quality data that increases public awareness and leads to action that reduces risk to life and property.
DOGAMI	Director, State Geologist	DOGAMI's mission is to provide earth science information and regulation to make Oregon safe and prosperous.

5.4.3.1 Hazard Mitigation Grant Review Board

The Hazard Mitigation Grant Review Board (the Board) is an intergovernmental body which when convened reviews, discusses, ranks, and recommends project selections for funding under Section 404 of the Stafford Act (i.e., Hazard Mitigation Grant Program—HMGP). For smaller, less complex disaster events, the State Interagency Hazard Mitigation Team (State IHMT) provides input to the HMGP selection process by recommending priorities for mitigation projects. By establishing project priorities early in the disaster recovery process, mitigation project opportunities can be more quickly identified based on the extent and nature of the disaster event. The State IHMT, in considering project priorities, respects mitigation actions and strategies developed in the state natural hazard's mitigation plan as well as recognizing and supporting local government mitigation actions and priorities. The State IHMT also supports the state's "incremental process" in providing technical assistance to sub-applicants by using a project pre-application (Notice of Interest) that can be used to vet projects for the program eligibility parameters. Projects that do not meet basic program eligibility parameters can be identified quickly and do not move forward to a full project sub-application for FEMA's consideration. Project sub-applications, when considering all of the program criteria, will only be submitted to FEMA when they are complete with all supporting documentation.

The Board was first established and used extensively during the three major disasters that occurred in 1996 (DRs: 1099, 1149 and 1160). At that time, there was no requirement for local mitigation planning to consider and identify mitigation project actions prospectively before the next disaster. In fact, the jurisdictions that participated in these HMGP offerings in 1996 and 1997 were required to develop a hazard mitigation plan, minimally, for the hazard that was the nature of their disaster losses. In those early years, the Board essentially reviewed and ranked project applications looking at criteria such as project feasibility, benefit-cost analysis, environmental considerations, and geographic diversity to evaluate proposed projects for state selection and funding consideration by FEMA. With the Sandy Recovery Investment Act of 2012, FEMA (and in turn the states) is directed to streamline HMGP activities and implement the program in a timelier manner. Moving HMGP activities forward in a more timely fashion is welcomed by Oregon and fits into the model the state developed during recent Joint Field Office operations for DR-4055 and during current disaster DR-4169.

With requirements for FEMA-compliant (201.6) local mitigation plans to be eligible for Section 404 grants, the need to convene the Hazard Mitigation Grant Review Board has been largely replaced (except for large scale disaster events) by project actions and priorities identified in local mitigation plans. In order to expedite the Section 404 grant offering early in the post-disaster recovery process, HMGP project funding is first prioritized to the disaster-declared counties (and all eligible applicant entities therein) on a pro rata share basis of their Public Assistance and/or Individual Assistance eligible costs as initially determined during the FEMA/State Preliminary Damage Assessment. Using this methodology to allocate HMGP funding to the declared counties in the disaster's HMGP offering ensures geographic diversity to showcase the benefits of mitigation in the disaster-impacted area. All things being equal, all HMGP projects must meet minimum state and FEMA project eligibility, and if the basic eligibility criteria are not met, HMGP funding will be offered to other applicants with eligible projects. When considering a number of mitigation projects, where there are generally more projects than available funding, those projects that reduce repetitive losses and address multiple hazard will generally have better benefit-cost ratios and ranked higher for selection consideration. The pro rata applicant share (total amount of HMGP funding) is now established at the 12 month (ceiling amount) HMGP lock-in as described in the 2015 Unified HMA Guidance. HMGP planning grant funding (based on a 7% planning set-aside cap) is available statewide from the onset of the program's availability. Considering

planning sub-application early in the HMGP offering often expedites funding of planning subgrants, before project sub-grants can be developed for FEMA's review.

During the Public Assistance (PA) and HMGP Applicant Briefing, the state confirms priorities and project categories for Section 404 project pre-applications that tend to focus on the nature of the disaster declaration and related mitigation opportunities. Representatives from the State IHMT are asked to provide their input into establishing the priorities and project categories for Section 404 project pre-applications early in the process. With SRIA, Congress has requested and FEMA requires an HMGP roll-out that needs to occur much more quickly to ensure projects are identified early in the recovery process and implemented in a way that the benefits of mitigation can occur sooner. The State IHMT can play an important role in selecting 5% State Initiative Projects," those that are difficult to evaluate against traditional program cost-effectiveness criteria, as there are always many more "5% projects" than available funding.

HMGP funding restrictions:

- Up to 7% of the Grantee's HMGP ceiling may be used for subgrants for prioritized state and local mitigation planning activities in compliance with 44 CFR Section 201.3(c)(4).
    - Since FEMA-approved hazard mitigation plans are required for FEMA-funded mitigation projects, having a current, mitigation plan is a predominate criterion in evaluating planning sub-applications.
        - 1st priority: those that have never developed a plan,
        - 2nd priority: those with expired plans,
        - 3rd priority: those out 12-18 months to expiration, and
        - 4th priority: those out 18-30 months to expiration.
- Up to 5% of the Grantee's HMGP ceiling may be used for mitigation measures that are difficult to evaluate against traditional program cost-effectiveness criteria (the "5% State Initiative Projects).
    - State's Prioritization for HMGP 5% subgrants
        - Based on the nature of the disaster
        - Warning Systems (such as those for the flood hazard)
        - Emergency Communication Systems & Capabilities (such as those for the windstorm and winter storm hazards)
        - Projects for which a benefit-cost ratio is difficult to determine but are otherwise eligible

Board Membership

Should there be a need to convene the Hazard Mitigation Grant Review Board, the following representatives would comprise the Board and meet to prioritize and guide the project selection process:

- Director of the Oregon Office of Emergency Management or designee (most usually the Section Director, Mitigation and Recovery Services who may also be State Coordinating Officer for major disaster declarations). This position serves as Chair of the Board;
- State Floodplain Program Coordinator of the Department of Land Conservation and Development or designee;
- President of the Oregon Emergency Management Association (OEMA) or designee;
- A representative of the Association of Oregon Counties (AOC), as applicable
- A representative of the League of Oregon Cities (LOC), as applicable; and
- For flood disasters and related projects, a representative from the U.S. Army Corps of Engineers (USACE).

Membership may vary depending on the type of disaster and expertise needed.

The State Hazard Mitigation Officer (SHMO) of the Oregon Office of Emergency Management provides staff and technical assistance, but is not a voting member. The SHMO works with the Board to develop the state's HMGP Administrative Plan for each disaster. The HMGR Board relies on the SHMO's experience with mitigation project implementation to help the members understand mitigation needs and priorities representative of the geographic diversity of Oregon, and identify resources and opportunities for potential applicants. During large disasters, the SHMO's position can be augmented with additional staff if so approved by the agency head or by legislative authority.

In addition to the position's work with the HMGR Board, the SHMO serves as the state's primary point of contact for all of FEMA's HMA grant programs as well as mitigation programs administered by OEM. Working with local governments, the SHMO has a broad understanding of the state's natural hazards and risks, mitigation strategies and project treatments, planning resources, and grants management requirements associated with federal and state funding. All mitigation planning and project applications that are submitted to FEMA by OEM are submitted by the SHMO who has overall responsibility for managing the state's mitigation program.

5.4.4 Monitoring Mitigation Measures and Project Closeouts

OEM systematically monitors the implementation of FEMA-funded mitigation measures using: 1) required subgrantee quarterly reporting, 2) telephone and e-mail communications, and 3) project site monitoring as required. Successful project implementation requires open communication between the grantee and subgrantee to ensure schedules, budget, and scope-of-work deliverable requirements are met. Project closeouts are always conducted on site allowing the grantee and subgrantee to certify completion of the project activity (performance component) and that all eligible expenses have been submitted, reviewed for eligibility and reimbursed (financial component). All matters involving Environmental & Historic Preservation compliance as stipulated in the Record of Environmental Consideration at the time of project funding obligation must also be documented and certified at the time of project close-out. OEM documents project closeout by summary performance and financial reports making sure the subgrantee is aware of documentation retention requirements, audit requirements, and maintenance schedule (if so required) to ensure the performance of the mitigation over the life of the project. FEMA has developed checklists that facilitate the sub-grant close-out process.

The process used to monitor the implementation of mitigation measures and project closeouts includes tracking action items identified in both the state NHMP and local government NHMPs. The state IHMT is responsible for monitoring implementation of projects identified in the state NHMP and is further advised, annually, of progress made in implementing measures at the local government level for which OEM is the grantee for FEMA funding. The State Hazard Mitigation Officer (SHMO) is responsible for reporting this information to the state IHMT for projects funded by the Hazard Mitigation Grant, Pre-Disaster Mitigation and Flood Mitigation Assistance programs.

Outside of the traditional FEMA mitigation grant programs, state and local governments identify and oftentimes implement mitigation measures using local capabilities and resources. This includes the development and adoption of local ordinances and regulations that include a hazard mitigation component, mitigation codes and standards as part of ongoing transportation and public works programs, hazard-related components of local comprehensive land use plans, and so forth. While it may not be possible to track and report on every mitigation accomplishment in state and local mitigation plans, communities will see the positive, cumulative impacts of these efforts in reduced disaster losses. The state encourages the seamless integration of mitigation activities into the day-to-day operations of state and local government programs.

All of the members of the State IHMT have a role in working with local communities and helping them consider, develop and submit eligible, cost effective Hazard Mitigation Assistance applications. This role, however, falls increasingly upon the State Hazard Mitigation Officer (SHMO) and State NFIP Coordinator who spend considerable time communicating with communities to help them develop proposals. And while a history of Oregon's mitigation grants management shows a capability to handle funds appropriately and to implement, monitor, and close out mitigation projects, current staffing levels and systems have been strained following large disasters with increased funds to handle, disperse to subgrantees, and monitor while the grant is active and after close out. Required FEMA monitoring and OIG audits which largely deal with retrospective matters and do not necessarily have a component of forward progress also consume the SHMO's time.

Present staffing levels and loss of knowledge and expertise due to staff turnover present challenges in grants management, project implementation, monitoring, and close-out. OEM submitted a request for

increased funding which would allow the agency to hire two (2) additional staff to assist the SHMO, in addition to working on other hazard mitigation activities.

The state of Oregon complies with all federally mandated reporting requirements. However, current staffing levels make it challenging to comply with reporting in a timely manner. Nevertheless, the state has redoubled its efforts and made significant progress in addressing federally required reporting criteria. By letter dated February 27, 2015, FEMA approved Oregon's 2012 Natural Hazards Mitigation Plan as an enhanced plan meeting all program management requirements.

5.5 Mitigation Action Assessment

Requirement 44 CFR §201.5(b)(2)(iv), A system and strategy by which the State will conduct an assessment of the completed mitigation actions and include a record of the effectiveness (actual cost avoidance) of each mitigation action.

The overall goal of hazard mitigation planning is the implementation of mitigation measures that avoid or reduce future disaster losses. By carefully documenting project implementation costs as well as post-disaster cost-avoidance, it is possible to measure the effectiveness of mitigation throughout the state. Mitigation project success stories, while not necessarily quantifying losses avoided, validate that mitigation can be incorporated both pre-disaster and during post-disaster recovery, and successfully reduce the impacts of future disaster events.

Calculating hazard event losses that were avoided as the result of a mitigation project requires pre- and post-disaster mitigation data. These data sets can be analyzed in detail using a process that is not unlike a benefit-cost analysis. As described within **Table 5-3**, the state continues to work with FEMA Region X mitigation staff to crosscheck the state's historic database of mitigation projects (mainly flood-related property acquisitions and elevations, facility earthquake retrofits, and electric utility projects that convert overhead power lines to underground) by completing project close-out assessments. Project close-out assessments are the basis from which mitigation success stories can be further quantified as losses avoided. Maintaining a detailed cost accounting of the mitigation project implementation costs, engineering specifications, as built certifications, and the original benefit-cost analysis are the essential data sets needed to quantify losses avoided. When mitigation project costs are evaluated by post-disaster measures of success, the state is able to determine overall project effectiveness.

Table 5-3. Calculation of Hazard Event Losses

Project Close-Out Assessment Track	Post-Event Assessment Track
Financial records and certifications Performance and as-built reports On-site final inspections Documentation retention • Per state and federal regulations • Local government financial requirements • NEMIS and e-Grants requirements Electronic file back-ups on programmatic certifications are maintained indefinitely	Annual EMPG reporting Local disaster events and reporting • IDA/PDA reporting process • NFIP loss data and insurance claims • Benefit-Cost Analysis from mitigation project application • Consumer owned electric utility and special district reporting Documenting post-event mitigation success stories Calculating losses avoided

Source: OEM

Currently, the state does not have the staff or financial resources to systematically track potential losses avoided for each action taken. The state does, however, maintain documentation of "mitigation success stories" (**Section 3.3.5**). These are completed actions that have shown to be successful by: 1) avoiding potential losses; and/or 2) demonstrating cost-effectiveness through benefit cost analysis and/or other quantitative assessment. Likewise, actions that support mitigation efforts, like risk or vulnerability assessment studies, are included in Section 3.3.5 as well. Mitigation success stories are completed with input from the action's coordinating agency.

In the future, the state will capitalize on opportunities to record the actual effectiveness (quantitative measurement) of successful mitigation actions and losses avoided. Much like the Benefit-Cost Analysis Toolkit developed and required by FEMA, there is significant interest by FEMA in developing a similar toolkit to assist states and local governments in quantifying the success of mitigation projects. As of this writing, there is no prescribed methodology promulgated by FEMA to undertake this effort. The simplest approach, at least for the flood hazard, is to evaluate *previous* NFIP flood loss properties following successful mitigation treatments. In the simplest case, a damaging flood prior to mitigation should minimally have similar losses avoided following mitigation. For electric utility projects (overhead to underground power line conversions) the simplest metric to obtain from the utilities is the reduction (up to elimination) of power outages caused by "downed" power lines. Such was the case following FEMA disaster DR-4169 by outreach to public, electric utility providers that unanimously reported on the effectiveness of FEMA-funded mitigation projects.

The state will take advantage of opportunities that arise in the future, when new hazard events occur and resources become available, especially during Joint Field Office (JFO) operations following Major Disaster Declarations. It is the state's intention to take advantage of the Hazard Mitigation Technical Assistance Program and Community Education & Outreach resources during JFO operations to objectively quantify mitigation successes through loss avoidance reports and success stories. JFO procedures include the following opportunities that can by pursued pending available FEMA and state resources:

- Even before a FEMA/State PDA is convened, the state conducts an Initial Damage Assessment (IDA). The state will provide information on previously implemented mitigation projects to the impacted local governments to immediately consider not only for documenting successful mitigation projects but to identify new mitigation opportunities with both Public Assistance and stand-alone mitigation funding *pending* a Major Disaster Declaration. Of course, not all disasters meet Major Disaster Declaration thresholds, and these "initial" opportunities to quantify successful mitigation projects further support the notion that the success of those projects, in fact, helped reduce the overall losses associated with the disaster.
- When the FEMA/State PDA is convened but prior to field data collection, the state provides an inventory of completed mitigation projects to the PDA teams. Previously implemented mitigation projects will be discussed with potential applicants to capture mitigation successes and loss avoided data.
- When appropriate mitigation successes and/or data are available the Hazard Performance and Analysis Group will be engaged to complete a loss avoidance study and the Community Education and Outreach group will complete success stories and best practice documentation.
- Additional follow-up on the success of previously implemented mitigation projects will be used as examples during the Public Assistance and Hazard Mitigation Grant Program Applicant

Briefings following a Major Disaster Declaration. Additional information will be captured on losses avoided and success stories.

Of particular and specific interest for a detailed loss avoidance study are mitigated, repetitive flood loss properties in the City of Tillamook and around Tillamook County, the Johnson Creek / Lents area in Portland, and a large number of recently implemented projects in the City of Vernonia. A number of these previously mitigated properties have been “challenged' by new flood events with no or minimal property damage.

Objectively reporting on mitigation successes increases interest at all levels of government and within the community, and provides opportunities in partnering mitigation resources such as project funding and technical assistance. Oregon has been quite successful, through the Silver Jackets initiative, to leverage Federal and state technical assistance in support of community flood awareness, preparedness and mitigation. Furthermore, it can be expected that the accrued benefits from mitigation expenditures will continue to increase over the effective life of projects, as cumulative losses avoided grow with subsequent hazard events. Repetitive hazard loss properties become repetitive mitigation successes stories.

During the three year period covered by this state plan update, Oregon experienced three Major Disaster Declarations: DR-1956, DR-1964 and DR-4055.

- DR-1964 was Oregon’s first tsunami Major Disaster Declaration (far-field event originating from a massive subsea earthquake near Japan). Effects from the trans-ocean tsunami in Oregon were largely confined to rapid changes in sea levels at port facilities in Curry and Lincoln Counties. Previously developed tsunami evacuation planning and inundation mapping were used as a life-safety measure (no lives were lost to the tsunami wave activity) based on the Pacific-wide tsunami warning. The tsunami wave impacts, although much less than those from a near-field Cascadia event, provided further impetus for the City of Newport to consider and seek mitigation funding for a tsunami “safe haven” project that will retrofit an existing land feature as a “high ground” evacuation site. The Port of Brookings Harbor implemented a post-disaster, multi-hazard mitigation project to protect their port facility from far-field tsunami waves and for storm surge waves that can occur during any winter season.
- Disasters DR-1956 and DR-4055 included regional flood and landslide impacts in western Oregon. Based on past experience with flood impacts to developed properties and the success of floodplain acquisition projects, the top mitigation priority for both disasters included the acquisition of residential properties substantially damaged by flooding and landslides. Residential property acquisition project opportunities s in Clackamas, Columbia, Marion, Linn, Benton, Coos, and Curry counties were identified during the PDA process and funded by the respective disaster’s HMGP. By recognizing the success of past floodplain and landslide acquisition projects, the state was able to implement a mitigation strategy that has a clear record of eliminating future disaster losses. For DR-4055, floodplain elevation projects (residential properties not substantially damaged) were identified in Lane, Linn. Lincoln, and Polk Counties and also implemented using HMGP funding. Oregon’s first (and only) floodplain property relocation project was also implemented using DR-4055 HMGP funding.
- Oregon was one of the first states to use funding from the Flood Mitigation Assistance (FMA) Program and the NFIP’s Increased Cost of Compliance (ICC) benefit in the late 1990’s. A number of residential properties along the lower Siletz River in Lincoln County that were impacted by damaging floods in 1996, ’97, and ’98 were identified for mitigation and elevated. The success of

that program continues to be a model for other properties in that watershed that have been subsequently elevated, including one property from DR-4055, HMGP.

5.5.1 Tillamook Bay Repetitive Flood Loss Properties

As staff and funding resources allow, OEM conducts loss avoidance studies that quantitatively assess the effectiveness of hazard mitigation projects. The most recent loss avoidance study, completed in September 2009, was supported by FEMA's Hazard Mitigation Technical Assistance Program (HMTAP) under the auspices of DR-1824. The loss avoidance study was developed to evaluate the success of flood mitigation projects in Tillamook County which has experienced significant, repetitive flood losses beginning with Stafford Act assistance provided under DR-853 (January 1990) through DR-1824, a total of four major declarations and at least another four significant flood events that were not declared. Flood Mitigation Assistance (FMA) program funding was also used to acquire and elevate flood-prone properties.

In this area, minor flooding of low-lying dairy and pasture land north and east of Tillamook can be expected when the water level exceeds 12 feet, particularly during high tides. Above 14 feet, widespread lowland and dairy alnd flooding begins. Sloughs north of the City, mainly Dougherty, begin to overflow. Minor flooding begins in the business district north of Tillamook and along Highway 101, particularly during high tides.

During the period of 2011-2014, the following flooding on the Wilson River stream gage was reported:

- 14.12 ft on 12/21/2014
- 14.69 ft on 11/20/2012
- 12.36 ft on 03/30/2012
- 13.50 ft on 03/15/2012

No building flood damages were identified during this reporting period as the water levels stayed just below significant flood height. Most of the low-lying buildings that would have been impacted from water levels exceeding 14 feet had been previously acquired or elevated. No major disaster declarations were related to these flooding events.

Low-lying areas between the Coast Range and the Pacific Ocean in southwestern Oregon are particularly vulnerable to severe flooding. The City of Tillamook, which is located in this region, has repeatedly experienced severe floods, most recently on January 8, 2009 (post DR-1824). In response to these repetitive events, the City and County of Tillamook implemented a number of non-structural flood mitigation projects to reduce damages from future flooding. The projects consisted of the acquisition, elevation, and relocation of flood-prone buildings. The local governments completed the projects with assistance from FEMA, the State of Oregon, other public agencies, and private entities.

Multiple flood events have occurred since the completion of the mitigation projects; the floods could have damaged the buildings if the projects had not been completed. To evaluate losses avoided by the projects, FEMA offered HMTAP assistance to Oregon to support a study to evaluate losses avoided by nine of the projects, the elevation of three commercial buildings and the acquisition/demolition of six commercial buildings along U.S. Highway 101 in the City of Tillamook.

FEMA calculated the value of the losses avoided and compared the value to the cost of mitigation. The aggregate losses avoided were valued at $3.1 million, and the aggregate project cost was valued at approximately $4.7 million (both values in 2009 dollars), resulting in a return on investment of 66%. FEMA estimates that elevation projects have an average useful life of 30 years, and that acquisition projects have a useful life of 100 years. The majority of the projects discussed in the Loss Avoidance Study: Oregon, Property Acquisition and Structure Elevation were implemented after 2003. It is anticipated that the value of the losses avoided, and therefore the return on investment, will increase in the future as other flood events occur.

The complete *Loss Avoidance Study* is located in **Appendix 9.3.2**.

5.5.2 Johnson Creek Floodplain Acquisition and Restoration Project

Almost every year, whenever a large rainstorm event would pass through Portland, Johnson Creek would flood the flat, residential and commercial areas along Foster Road and SE 100th, 106th, and 108th avenues if waters rose over 11 feet. Given the repeated flooding, the city of Portland invested in the voluntary acquisition of flood-prone homes and restoring 70 acres of the Johnson Creek watershed.

A major storm in January 2012 tested the restoration efforts. Johnson Creek rose to 13 feet, and while it was close, homes and businesses were spared flooding. Water instead filled the restored floodplain that diverted floodways away from the roadway into 120 feet of new flood storage. The 60-acre site, called the Foster Floodplain Natural Area will be transferred to Portland Parks to be managed as a natural area. According to Maggie Skenderian, Johnson Creek Watershed manager for Portland Environmental Services, the city successfully addressed flood damage and made wildlife habitat improvements. “In the 1930s, they thought if they moved water downstream it would alleviate flooding—it didn’t work,” she says.

The city bought out the residents who lived on the 70 acres south of Johnson Creek. Buying and demolishing some 60 houses, dating from the mid-20th century, cost $12 million; a new bridge and floodplain restoration to open space cost $8 million. A portion of the project funding for the voluntary property acquisitions was initially provided by the Hazard Mitigation Grant Program from DR-1099, February 1996 Oregon Flood Disaster. Floodplain restoration, to restore floodplain function and reduce the extent of the flooding, was provided by a Pre-Disaster Mitigation grant in 2005. Along with substantial city funding this project leveraged opportunities to reduce flood impacts in the community and eliminate future losses to the National Flood Insurance Program within the project area and reduce losses north of Foster Road. It is easy to see that with no improved properties to flood in this section of the Johnson Creek floodplain, there were no insured losses whatsoever with significant cost savings to the National Flood Insurance Fund.

The following success stories are in **Section 3.3.5**.

- **Oregon Storm Mitigation:** Mitigation brings Enhanced Safety and Reduces Losses. This project resulted in the state of Oregon working with utilities around the state on projects to underground power lines to enhance safety and reduce losses during winter storms.
- **Benton County and Consumer Power Inc.:** Mitigation for Winter Storms. Consumer Power Inc. undergrounded power lines to enhance safety and reduce losses during winter storms.

- **Lane County and Emerald People's Utility District Mitigation for Winter Storms:** Emerald People's Utility District undergrounded power lines to enhance safety and reduce losses during winter storms.
- **Springfield and the Springfield Utility District Mitigation for Winter Storms:** Springfield Utility Board undergrounded power lines to enhance safety and reduce losses during winter storms.
- **Vernonia Relocation and Replacement of Three Schools:** This project resulted in replacing three school buildings that experienced repeated damage out of the floodplain.
- **Johnson Creek (Portland) Floodplain Acquisition and Restoration Project.** To reduce chronic flooding, the City of Portland voluntarily acquired and demolished 60 houses to restore the floodplain to open space.
- **Tillamook Bay Repetitive Flood Loss Properties (Southern Flow Corridor—Landowner Preferred Alternative Project).** The City and County of Tillamook implemented a number of non-structural flood mitigation projects to reduce damages from future flooding. The projects consisted of the acquisition, elevation, and relocation of flood-prone buildings.

5.6 Effective Use of Available Mitigation Funding

Requirement 44 CFR §201.5(b)(3), Demonstration that the State effectively uses existing mitigation programs to achieve its mitigation goals.

5.6.1 Current and Potential Funding

Funding to implement mitigation measures (including repetitive loss properties) can come from a number of sources, including government (local, state, and federal), private sector, foundations, insurance claims, and from citizens themselves. The funding can be in the form of grants that may or may not require a match as well as loans of different types. Prior to a disaster, grants and loans can be made available on a scheduled or special announcement basis. Following a disaster, when opportunities for mitigation are often best coupled with the recovery effort, post-disaster grants and loans come from a number of sources. Citizens themselves make significant contributions to mitigation projects, providing matching funds or even the full amount of funding from their own resources. In Oregon, residential property owners participating in the FEMA-funded property acquisition programs most always provide the non-Federal match contribution of 25% of the pre-disaster real market value of the property damaged by the disaster, realizing seventy-five cents on the dollar for their property (improvements and land valuation).

5.6.2 Funding Used to Implement Mitigation Actions

The Stafford Act provides FEMA the authority to fund the restoration of eligible public facilities that have sustained damage due to a presidentially declared disaster. Under FEMA's Public Assistance Program (Section 406 of the Stafford Act), when considering the restoration of damaged facilities, there are provisions for the consideration of funding additional measures that will enhance a facility's ability to resist similar damage in future events. Oftentimes one of the best occasions to implement mitigation measures becomes evident when evaluating repair of disaster-damaged components of facilities. When implemented in conjunction with repair and restoration, cost-effective mitigation treatments can eliminate or reduce recurrence of similar damage from future, similar disaster events. Such measures are in addition to any measures undertaken to comply with applicable codes and standards, although such compliance, itself, could be considered a form of mitigation. Oregon's Public Assistance Program policy is to consider all potential, eligible mitigation opportunities when reviewing Public Assistance Program Project Worksheets for permanent repair and restoration of damaged facilities. Oregon's Public Assistance (Program) Officer works directly with FEMA staff to ensure all Project Worksheets are reviewed for mitigation consideration (406 Mitigation).

Table 5-4. Section 406 Mitigation Report—Disaster Summary 2012–2104

Disaster Declaration	# Project Worksheets Written	Worksheets w/Mitigation	406 Mitigation $ Awarded	Total $ Awarded on All Projects
DR-4055	520	81	$779,814.00	$20,920.469.83
DR-4169	50	0	$0.00	$8,183,833.20

Section 406 hazard mitigation funding and funding offered under the Hazard Mitigation Grant Program (HMGP, Section 404) are distinct but can actually work together. Section 406 mitigation is generally only applied on the parts of the facility that were actually damaged by the disaster with the mitigation measure providing protection from subsequent events. Components of a facility that were not damaged but could benefit from mitigation could become eligible for consideration under Section 404. Much like Section 406 mitigation, the Section 404 mitigation work must be cost effective and be reasonably performed as part of the work or measure which will reduce the potential for damage to a facility from a disaster event. In these instances, the application for Section 404 hazard mitigation funding must be submitted in a timely manner, consistent with State and local hazard mitigation plans. It is Oregon's mitigation policy to consider, where feasible and cost-effective, opportunities to accomplish joint 406/404 mitigation early in the disaster recovery process during Joint Field Office (JFO) operations. Public Assistance Project Worksheets and HMGP project applications can be developed in tandem and quickly evaluated for potential cost-effective mitigation measures. There is, of course, no guarantee that 406/404 mitigation opportunities will occur with every disaster but by considering these "joint opportunities" early in the recovery process good mitigation projects can be quickly identified, reviewed and approved, and implemented in such a way that mitigation benefits are enjoyed sooner rather than later. Each disaster-specific HMGP Administrative Plan will address evaluating opportunities for joint 406/404 mitigation and establish a state selection criterion as a priority for consideration during JFO operations.

Table 5-5. Sections 406/404 Joint Mitigation Report—Disaster Summary 2012–2014

Disaster Declaration	# Joint Mitigation Opportunities Identified	# Joint Mitigation Opportunities Implemented	404 Mitigation $ Awarded for Joint Projects (75% share)	Total 404 Mitigation $ Available (75% share)
DR-4055	2	1	$26,276	$2,977,380
DR-4169	1	0	$0.00	$953,345

Disaster DR-4169, declared in April 2014, was a severe winter storm with significant snow and ice impacts to public, electric utility providers. Because most electric utilities implement permanent repairs to their damaged infrastructure (to quickly restore electric service to impacted customers), there were few standalone 406 and joint 406/404 mitigation opportunities identified. Standalone, Section 404 HMGP projects from this disaster emphasize mitigation projects that convert overhead power lines (with a history of past losses) to underground service.

5.6.2.1 Hazard Mitigation Grant Program (HMGP)

All past disaster HMGP sub-grant activities prior to 2007, up to and including DR-1683 (declared in February 2007) have been completed. At the time of this 2015 plan update, there are seven actively open disasters, as shown in **Table 5-6**.

Table 5-6. HMGP Disaster Status and Funding (2007–2014)

Disaster (#Subgrants)*	Federal Share Available*	Federal Share Obligated*	Explanation
DR-1683 (4)**	$828,838	$828,830	all sub-grants completed and closed-out
DR-1733 (25)	$15,358,404	$15,348,380	PoP ended 12/31/14; currently in liquidation
DR-1824 (8)	$2,884,628	$1,729,014	PoP ends 3/31/15; two sub-applications were dropped when the non-Federal match share was lost due to the economic down-turn in 2009
DR-1956 (5)	$987,001	$779,949	PoP ends 2/17/16; pending phased project in Clackamas County will likely expend remaining Federal funding
DR-1964 (5)	$1,211,616	$1,097,092	PoP ends 3/25/16; any remaining Federal share funding would be applied to eligible cost overruns on (potentially) two sub-grants
DR-4055 (18)	$3,122,974	$3,015,382	PoP ends 3/1/16; any remaining Federal share funding would be applied to eligible cost overruns on (potentially) three sub-grants
DR-4169 (3)	$999,964	$195,655	sub-application period still open (as of 12/31/14) with three sub-grants approved and obligated

*Includes State Management Cost subgrant

**DR-1683 did not have a direct State Management Cost subgrant obligation.

Source: OEM

Beginning with DR-1733, grantee and subgrantee administrative costs are no longer being provided by FEMA and have been replaced by a state management cost (SMC) calculation. The state, as the grantee, can choose to allocate SMC funding to subgrantees to offset their costs for applying for and administering Federal sub-grant funding. For smaller disaster declarations, OEM has chosen not to extend HMGP state management funding to subgrantees but rather to use those resources, in part, to provide direct technical assistance, including benefit-cost analysis training and application reviews, and developing approvable sub-applications for FEMA's consideration. OEM relies greatly on local jurisdiction mitigation plans to identify priority HMGP project activities that can be implemented quickly in the post-disaster environment.

5.6.2.2 Flood Mitigation Assistance (FMA) Program

Flood hazard mitigation became a top priority in Oregon in the mid-1990s, resulting in increased funding for hazard mitigation. Four areas that experienced repetitive flooding in 1996 and 1997 received the bulk of the project funding: Lower Johnson Creek in Portland; Tillamook County and City; the Lower Siletz area in Lincoln County; and the unincorporated area of Mapleton in Lane County. Many dozens of flood-loss properties have been elevated, relocated or acquired in these areas with very minimal or no damage to the mitigated properties during subsequent floods. In addition to these local governments, Vernonia, Wallowa County, Scio, and others have developed and successfully implemented strategies to

address repetitive hazard losses. By proactively developing policies, engaging in planning, and implementing mitigation measures, local governments are developing policies, and building capability for reducing disaster losses.

Flood Mitigation Assistance (FMA) Program: All grants prior to and including FY 2012 are completed and closed with the FY2009 offering closed-out with FEMA in December 2014. Although closed, of particular interest is the FY 2009 offering of the FMA grant program that included a supplemental allocation offered to the states on a first-come basis. Oregon seized this opportunity and received significant FMA funding (as reported in Federal share, EMS-2009-FM-E001) for the projects listed in **Table 5-7**.

Table 5-7. Flood Mitigation Assistance Projects and Funding (2009–2014)

Project	Federal Obligation	Funding Spent	Explanation
FMA FY2009			
City of Lexington (Fire Station/ City Hall Flood Acquisition)	$103,281	$103,281	project completed and closed-out
City of Vernonia Home Elevations	$532,367	$353,788	project completed and closed-out; SOW modified for properties that chose not to participate
Vernonia School District Floodplain Acquisition	$11,287,267	$11,287,267	project completed and closed-out
West Oregon Electric Co-op Headquarters Acquisition	$813,775	$813,717	project completed and closed-out
City of Madras Police Station/City Hall Floodway Acquisition	$412,498	$386,445	project completed and closed-out; cost savings on demolition & site restoration
Lake Oswego Dam Spillway Retrofit Project	$957,703	$957,703	project completed and closed-out
FMA FY 2010			
Multnomah County / Flood Hazard Mitigation Planning	$19,000	$19,000	project completed and closed-out
FMA FY 2012 (SRL)			
Lincoln City / SRL 2012 Flood Elevation Project	$135,333	$135,333	project completed and closed-out
FMA FY 2014 (SRL)			
Linn County / SRL 2014 Flood Acquisition Project	$325,500	$297,678	project still underway; demolition yet to be completed

Source: OEM

The Vernonia School District Acquisition project is a showcase flood hazard mitigation project that would not have been possible without the unwavering support from FEMA Region X staff. This project essentially demolished and relocated the function of the Vernonia K-12 school campus from the Special Flood Hazard Area to a new site totally out of flood harm's way. The current school campus has a long history or repetitive flood losses particularly those occurring in 1996 (DR-1099) and 2007 (DR-1733). All of the projects have been completed as of September 2014. The state provided a non-Federal match of $4 million for this project. Of the HMA grant programs, FMA has more rigorous project eligibility criteria and only addresses projects that mitigate the flood hazard and for improved properties only those that have NFIP insurance policies. Experience has shown this program requires significantly more grant management oversight by OEM to ensure projects are completed in a timely manner.

Although Oregon had only 11 Severe Repetitive Loss (SRL) properties in 2011, the State has made a concerted effort to mitigate them. Shortly after the SRL program was announced the State reviewed FEMA's vetted list of SRL properties to identify potentially ripe projects. The top candidate was a home in Lincoln City that could benefit from elevation. After numerous unsuccessful attempts to secure FY 2011 SRL funding, the state resubmitted the Lincoln City property to the FY 2012 offering of the SRL grant program. The project was funded, successfully implemented, and closed out in early 2014.

For the FY2013 offering of the FMA program (SRL was wrapped into FMA beginning this year) the State submitted a non-validated SRL property in Linn County for acquisition consideration. The property was brought to the attention of the State by a real estate agent who had listed the property for sale but could not find a buyer because of the building's flood history. Although the building met the definition of an SRL property (it apparently was missed in the vetting process), it was not selected for funding because it was not on FEMA's list of validated SRL properties. The State subsequently petitioned FEMA to include the Linn County property on the validated SRL list. It was added, resubmitted to the FY2014 FMA grant program offering and selected. Demolition is expected to be completed in the summer of 2015. One property dropped off the validated list in 2013 because it had not flooded within the rolling SRL 10-year eligibility window.

The State visited each of the remaining FEMA-validated SRLs in 2013 to gain a better understanding of what mitigation actions would most likely be successful and cost effective. Of these, one building was already under contract to be elevated using HMGP. That project was completed in 2014. Each of the remaining eight buildings appear suitable for elevation or acquisition. The State annually contacts the Emergency Managers in the jurisdictions where these buildings are located to suggest they contact the owners to make them aware of and encourage them to participate in the SRL program before their eligibility expires.

Table 5-8. Flood Mitigation Assistance Severe Repetitive Loss (SRL) Projects and Funding (2012–2014)

Funding Source	Date Completed	Location	Mitigation Type
SRL Program FY 2012	1/9/2013	Lincoln City	elevation
HMGP DR-4055	12/9/2014	Lincoln County	elevation
FMA Program FY 2014	project currently underway; completion scheduled for 8/1/2015	Linn County	acquisition

Source: OEM

5.6.2.3 Pre-Disaster Mitigation (PDM) Competitive Grant Program

All PDM FY 2009 and previous year sub-grants are completed and closed-out. Sub-grants from FY 2010 and later years are on-going (or awaiting close-out) with a number of projects completed. Table 5-9 shows the history of FY 2006 and later sub-grants.

Table 5-9. Pre-Disaster Mitigation Projects and Funding (2007–2014)

Project	Federal Obligation	Funding Spent	Explanation
PDM FY 2007			
Deschutes & Crook Counties Wildland Fire Mitigation	$1,010,190	$845,850	project completed and closed-out; project work exceeded original SOW expectations
Gladstone Fire Station Seismic Upgrade	$158,566	$158,566	project completed and closed-out
OPDR, Local Mitigation Planning in Regions 1 & 3	$250,000	$247,919	project completed and closed-out
City of Salem, Fire Station Seismic Retrofits	$1,036,125	$1,036,125	project completed and closed-out
PDM FY 2008			
Deschutes & Crook Counties Wildfire Fuels Reduction Project	$667,874	$229,841	project completed with a significant cost under-run and closed-out
PDM FY 2009			
City of Corvallis, City Hall Seismic Retrofit	$842,924	$641,294	project completed and closed-out
City of Gresham, Seismic Retrofit of Two Fire Stations	$391,723	$387,457	project completed and closed-out
OPDR, State of Oregon Local Plan Updates	$228,821	$226,925	project completed and closed-out
PDM FY 2010			
Harney Electric Co-op, Communication Site Mitigation	$264,413	$68,869	project in wrap-up phase
Deschutes, Crook & Klamath Counties, Central Oregon Wildfire Mitigation	$3,000,000	$0	EHP process underway; Federal funding not yet obligated
PDM FY 2011			
City of Canby, Water Reservoir Seismic Retrofit	$539,298	$539,298	project completed and closed-out
OPDR, Multi-hazard County Mitigation Plan Updates—Columbia Gorge Region	$215,981	$212,458	project completed and closed-out
PDM FY 2012			
Lincoln County School District, Waldport High School Tsunami Acquisition Project	$3,000,000	$3,000,000	project work completed
OPDR, Local NHMP Update Support	$399,999	$265,593	project work underway
PDM FY 2013			
OPDR, Local NHMP Updates	$250,001	$0	project work underway
City of Portland, Natural Hazards Mitigation Plan Update	$265,982	$0	project work underway
PDM FY 2014			
OPDR, PDM14 NHMP Updates	$250,000	$0	project work underway
DLCD Multi-hazard Mitigation Planning 2015-2017	$215,180	$0	pending FEMA approval and funding obligation
OSU Hazard Mitigation Plan	$76,388	$0	pending FEMA approval and funding obligation

Source: OEM

5.6.2.4 HMGP, FMA, PDM Grants Management Summary

The State of Oregon provides timely, complete, and accurate performance and financial quarterly reports on the FEMA-funded mitigation grants. To meet the consistent reporting deadlines to FEMA Region X, subgrantees are required to submit their individual performance quarterly reports to OEM by the 15th of the month following the end of the traditional calendar quarter. The subgrantee reports are reviewed and discussed with the subgrantee (where required), synthesized, and submitted to FEMA Region X by the end of that month. Financial reports are provided in a similar fashion. Scheduled subgrantee reporting to the state fulfills grants' monitoring requirements supplemented by on-site inspections (performance and financial) as required.

Table 5-10 presents a concise self-assessment of Oregon's overall capability to effectively manage HMGP, FMA and PDM grant program activities from application to close-out.

Table 5-10. Grant Performance, Process, and Close-Outs (as of 12/31/14)

Grant Program	Applications		EHP/BCA Information		Timely Reporting		Send for FEMA Close-Out	
HMGP	**to State**	**to FEMA**	**Status**	**Eligibility**	**Grantee**	**Subgrantee**	**Performance**	**Financial**
DR-853	closed	complete	closed	complete	yes	yes	closed	closed
DR-985	closed	complete	closed	complete	yes	yes	closed	closed
DR-1004	closed	complete	closed	complete	yes	yes	closed	closed
DR-1061	closed	complete	closed	complete	yes	yes	closed	closed
DR-1099	closed	complete	closed	complete	yes	yes	closed	closed
DR-1107	closed	complete	closed	complete	yes	yes	closed	closed
DR-1149	closed	complete	closed	complete	yes	yes	closed	closed
DR-1160	closed	complete	closed	complete	yes	yes	closed	closed
DR-1221	closed	complete	closed	complete	yes	yes	closed	closed
DR-1405	closed	complete	closed	complete	yes	yes	closed	closed
DR-1510	closed	complete	closed	complete	yes	yes	closed	closed
DR-1632	closed	complete	closed	complete	yes	yes	closed	closed
DR-1672	closed	complete	closed	complete	yes	yes	closed	closed
DR-1683	closed	complete	closed	complete	yes	yes	closed	closed
DR-1733	closed	complete	closed	complete	yes	yes	closing	Jun-2015
DR-1824	closed	complete	closed	complete	yes	yes	closing	Jun-2015
DR-1956	closed	phased	ongoing	ongoing	yes	yes	on-target	
DR-1964	closed	complete	closed	complete	yes	yes	on-target	
DR-4055	closed	complete	closed	complete	yes	yes	on-target	
DR-4169	open	open	ongoing	ongoing	yes	yes	on-target	
FMA (w/SRL)	**to State**	**to FEMA**	**Status**	**Eligibility**	**Grantee**	**Subgrantee**	**Performance**	**Financial**
FY97	closed	complete	closed	complete	yes	yes	closed	closed
FY98	closed	complete	closed	complete	yes	yes	closed	closed
FY99	closed	complete	closed	complete	yes	yes	closed	closed
FY00	closed	complete	closed	complete	yes	yes	closed	closed
FY01	closed	complete	closed	complete	yes	yes	closed	closed
FY02	closed	complete	closed	complete	yes	yes	closed	closed
FY03	closed	complete	closed	complete	yes	yes	closed	closed
FY04	closed	complete	closed	complete	yes	yes	closed	closed

Grant Program	Applications		EHP/BCA Information		Timely Reporting		Send for FEMA Close-Out	
FY05	closed	complete	closed	complete	yes	yes	closed	closed
FY06	closed	complete	closed	complete	yes	yes	closed	closed
FY07	closed	complete	closed	complete	yes	yes	closed	closed
FY08	closed	complete	closed	complete	yes	yes	closed	closed
FY09	closed	complete	closed	complete	yes	yes	closed	closed
FY10	closed	complete	closed	complete	yes	yes	closed	closed
FY11	closed	complete					no sub-grants awarded	
FY12 (SRL)	closed	complete	closed	complete	yes	yes	closed	closed
FY13 (SRL)	closed	complete					no sub-grants awarded	
FY14 (SRL)	closed	complete	closed	complete	yes	yes	on-target	
PDM	**to State**	**to FEMA**	**Status**	**Eligibility**	**Grantee**	**Subgrantee**	**Performance**	**Financial**
FY02	closed	complete	closed	complete	yes	Grantee	closed	closed
FY03	closed	complete	closed	complete	yes	yes	closed	closed
FY03-C	closed	complete	closed	complete	yes	yes	closed	closed
FY05-C	closed	complete	closed	complete	yes	yes	closed	closed
FY06-C	closed	complete	closed	complete	yes	yes	closed	closed
FY07-C	closed	complete	closed	complete	yes	yes	closed	closed
FY08-C	closed	complete	closed	complete	yes	yes	closed	closed
FY09-C	closed	complete	closed	complete	yes	yes	closed	closed
FY10-C	closed	complete	ongoing	complete	yes	yes	on-target	
FY11-C	closed	complete	closed	complete	yes	yes	closed	closed
FY12-C	closed	complete	closed	complete	yes	yes	on-target	
FY13-C	closed	complete	closed	complete	yes	yes	on-target	
FY14-C	updating	updating	ongoing	ongoing	yes	yes	on-target	

Note: "-C" indicates funding was from the nationwide competitive PDM program.

Source: OEM

5.6.2.5 Oregon's Seismic Rehabilitation Grant Program (SRGP)

The SRGP is a state of Oregon competitive grant program that provides funding for the seismic rehabilitation of critical public buildings, particularly public schools and emergency services facilities.

Eligible activities include structural improvements including non-structural, architecture and engineering, and project management. It does not fund demolition and rebuild or new construction, buildings located in the Tsunami Inundation Zone, or solely non-structural projects (e.g., chimney removal or bracing).

Buildings with a mix of eligible and ineligible uses can be considered if an entity pays for the ineligible portion of the building. Eligible projects can apply for as much as $1.5 million through the SRGP.

Funding is limited to public K-12 school districts, community colleges, education service districts and universities are eligible for the grant program. For emergency services facilities, the emphasis is on first responder buildings. This includes hospital buildings with acute inpatient care facilities, fire stations, police stations, sheriff's offices, 9-1-1 centers and Emergency Operations Centers (EOCs). For more

information visit the SRGP website, http://www.orinfrastructure.org/Infrastructure-Programs/Seismic-Rehab/.

The state anticipates selling bonds in spring 2015 to fund the program up to $30 million. An increased budget of $200 million has been requested for the 2015-17 biennium.

5.6.2.6 Oregon Watershed Enhancement Board (OWEB)

The OWEB is a state agency that provides grants to help Oregonians take care of local streams, rivers, wetlands, and natural areas. Community members and landowners use scientific criteria to decide jointly what needs to be done to conserve and improve rivers and natural habitat in the places where they live. OWEB grants are funded from the Oregon Lottery, federal dollars, and salmon license plate revenue. A 17-member citizen board drawn from the public at large, tribes, and federal and state natural resource agency boards and commissions leads the agency.

The Oregon Constitution specifies that OWEB may fund projects involving the purchase of interests in land from willing sellers for the purpose of maintaining or restoring watersheds and habitat for native fish or wildlife. OWEB-funded interests in land may be held by local, state, and federal agencies, tribes, not-for-profit land conservation organizations and trusts, state institutions of higher education, independent not-for-profit institutions of higher education, or political subdivisions of the state, as long as the entity continues to use the land for the purposes specified in the constitution.

OWEB may use its funds to purchase property, property rights, or conservation easements and to provide ecosystem enhancements near streams, rivers, wetlands, and natural areas, often assisting with flood mitigation. For more information visit http://www.oregon.gov/OWEB/Pages/index.aspx.

5.7 Commitment to a Comprehensive Mitigation Program

Requirement 44 CFR §201.5(b)(4)(i-vi), Demonstration that the State effectively uses existing mitigation programs to achieve its mitigation goals.

The State is committed to a comprehensive mitigation program to achieve its mitigation goals (**Section 3.2**). Programs and methods that demonstrate this commitment are detailed throughout this plan.

5.7.1 Capacity Building

44 CFR §201.5(b)(4)(i), A commitment to support local mitigation planning by providing workshops and training, state planning grants, or coordinated capability development of local officials, including Emergency Management and Floodplain Management certifications.

The state of Oregon aims to build local capacity in developing and implementing risk reduction strategies through plan development support, professional assistance, resource sharing, and technical assistance. Local planning and mitigation requirements are accomplished in great measure through a coordinated effort that fosters partnerships among agencies, communities, academia, and organizations to determine needs, identify issues and resources, and develop strategies for risk reduction. The Oregon Partnership for Disaster Resilience (OPDR or the Partnership) continues to provide a foundation for direct technical assistance to local governments in support of a range of risk reduction activities. Since 2004, the Partnership has systematically leveraged funding opportunities (primarily through FEMA's mitigation grants, annual Emergency Management Performance Grant (EMPG) funding and in-kind contributions) to provide direct technical assistance to local governments for the purpose of developing or updating existing local natural hazards mitigation plans and establish a course of action to secure funding for project implementation.

All 36 counties in Oregon have participated in a Natural Hazards Mitigation Planning process (**Table 3-12**). As plans mature the State of Oregon is committed to working with local jurisdictions to update and enhance them. It is envisioned that local mitigation plans in Oregon will be incrementally incorporated into local land use plans and implemented more directly through land use regulations. A demonstration project brought direct technical assistance to the City of Madras under PDM-12. Madras successfully integrated mitigation plan information (risk assessments, strategies and actions) into its comprehensive land use plan. The City hopes to update its development code and regulations next, focusing first on the City's Flood Ordinance.

The Oregon Disaster Response Fund helps state agencies and local governments with the non-federal cost share required to obtain Public Assistance program and hazard mitigation project funding related to a major disaster declaration in Oregon. Further, the state is proposing to expand the scope of this funding source to include mitigation planning.

In addition, DLCD has requested the Grants Advisory Committee to expand the scope of activities funded through its Technical Assistance Grants (TAG) Program to include natural hazard mitigation activities. In addition, DLCD has requested increased funding for these grants in the 2015-17 biennium.

The State Floodplain Coordinator routinely provides technical assistance to local governments and individual property owners and also provides training workshops for a variety of technical and

professional audiences. Table 5-11 shows the trainings and presentations the State Floodplain Coordinator provided on topics related to flooding and the NFIP during the period 2012-2014.

Table 5-11. Flooding and NFIP Outreach, 2012-2014

Year	Description	Audience	CFM Credit?
2012			
	Lane County Multiple Listing Service	real estate agents	no
	Professional Land Surveyors of Oregon, Annual Meeting	surveyors, floodplain managers	Yes
	The Seminar Group, "Impacts of FEMA Floodplain Mapping: Regulatory Changes and Implications for Local Jurisdictions and Property Owners"	lawyers	no
	Assisted STARR with Elevation Certificate training	floodplain managers	yes
	Assisted STARR with Elevation Certificate in Approximate A Zones training	floodplain managers	yes
	Code Enforcement Officers Workshop	code enforcement	no
	NFIP 101 training in Tillamook	floodplain managers	yes
	NFIP 101 training in Salem	floodplain managers	yes
	NFIP 101 in Hillsboro	floodplain managers	yes
	NFIP 101 in Fairview	floodplain managers	no
	Professional Land Surveyors of Oregon, Rogue Valley	surveyors	no
	Mid-Willamette Valley Council of Governments	floodplain managers	no
2013			
	Ticor Title, McMinnville	real estate agents	no
	Oregon Coastal Planners Network	planners	no
	Salem Association of Realtors	real estate agents	no
	NFIP Roundtable in Tillamook County	planners	no
	Clackamas County Association of Realtors	real estate agents	no
	Cannon Beach NFIP Workshop	public, planners	no
	Warrenton NFIP Workshop	public, planners	no
	League of Cities, Small Cities subcommittee	planners	no
	Neskowin Neighborhood Association	public	no
	Metro area Regional Solutions Team	planners	no
	Washington County Board of Realtors	real estate agents	no
	Tribal Roundtable, Economic Development Committee	tribal planners	no
	Marion County Association of Realtors	real estate agents	no
	Association of Oregon Counties Steering Committee	planners	no
	Conference for Oregon county appraisers and appraisal technicians	appraisers	no
	Silverton Association of Realtors	real estate agents	no
	Newport NFIP Workshop	planners. public	no
	Lincoln County NFIP Workshop	planners, public	no
	Professional Land Surveyors of Oregon, Annual Meeting	surveyors	yes
	Windermere, Eugene	real estate agents	no
	Keller Williams, Eugene	real estate agents	no
	Windermere, Albany	real estate agents	no
	Polk County Board of Realt	real estate agents	no
	Santiam Board of Realty, Silverton	real estate agents	no
	John Scott, Eugene	real estate agents	no
	Mid-Willamette Valley Board of Realty	real estate agents	no
	Portland Regional Solutions Team	planners	no

Year	Description	Audience	CFM Credit?
	Tillamook County Open House	public	no
	Washington County Planning Directors	planners	no
	Keizer Rotary	public	no
	Willamette Valley Professional Land Surveyors of Oregon Regional meeting	surveyors	no
	Oregon State Board of Examiners for Engineering and Land Surveying Symposium	surveyors	no
2014			
	The Meadows Group, Portland	real estate agents	no
	Central Coast Board of Realty	real estate agents	no
	Newport Chamber of Commerce	business Leaders	no
	Professional Land Surveyors of Oregon annual conference	surveyors	yes
	Windermere Real Estate, Salem	real estate agents	no
	Jackson County floodplain managers, Medford	floodplain managers	no
	Board of Commissioners, Benton County	elected officials	no
	Oregon Association of Realtors, webinar	real estate agents	no
	Coos County Board of Realty	real estate agents	no
	Oregon Emergency Management Association	emergency managers	no
	Coldwell Banker, Lake Oswego	real estate agents	no
	Reedsport community meeting on flood insurance and levee issues	public	no
	ReMax, Lake Oswego	real estate agents	no
	Willamette Association of Realtors, Adair Village	real estate agents	no
	Clackamas Couty “Flood of Information” community meeting	public	no
	L-273 Managing Floodplain Development class in Eugene, OR	floodplain managers	yes
	Fidelity Title, Eugene	real estate agents	no
	Oregon Association of Counties	planners, elected officials	no
	Coastal Planners Network, South and North	planners	no

Source: DLCD

The state also encourages interested parties to become Certified Floodplain Managers (CFMs). The purpose of the certification program is to “ensur[e] that highly qualified individuals are available to meet the challenge of breaking the damage cycle and stopping its negative drain on the nation’s human, financial, and natural resources” (www.floods.org). DLCD awarded 21 FEMA-funded scholarships to Oregon planners to attend the 2014 Association of State Floodplain Managers (ASFPM) annual meeting held in Seattle in May 2014. Today there are 85 CFMs in Oregon; 33 of those—almost 40%—obtained certification during the period 2012-2014 (ASFPM, 2015).

In 2014, DLCD initiated and continues to support two Community Rating System Users Groups (northern and southern Oregon) to encourage current participants to maintain their participation and increase their ratings, and to encourage non-participating communities to join the CRS Program. An online forum encourages communication and mutual support, as do regular meetings three times each year.

OEM provides training workshops and events focusing on earthquake, tsunami, and volcanic hazard preparedness, mitigation, and evacuation on a regular basis. OEM also provides technical assistance to local governments to evaluate their risks and vulnerabilities in order to access funding for implementing risk reduction measures. **Table 5-12** shows earthquake- and tsunami-related outreach events during the period 2012–2014. **Table 5-13** shows FEMA trainings related to mitigation offered by OEM during the same period.

Table 5-12. Earthquake- and Tsunami-Related Outreach Events, 2012–2014

Date	Location	Event	Number of Attendees
2014			
10/18/2014	Beaverton, OR	WA County Emrg Prep Fair	100
10/16/2014	Oregon	Great Oregon Shakeout	390,000
10/15/2014	Portland, OR	7x24	200
9/27/2014	Cannon Beach, OR	Race the Wave	100
9/19/2014	Hood River, OR	FBINAA	75
7/29/2014	Astoria, OR	Wayfinding Charrette	30
6/2/2014	Baker City, OR	Cascadia impact on Eastern Oregon	30
4/18/2014	Grants Pass, OR	Two Public workshops	150
4/17/2014	Medford, OR	Two Public Workshops	125
3/27/2014	Astoria, OR	Vulnerable populations workshop	11
3/26/2014	Seaside, OR	Vulnerable populations workshop	6
3/21/2014	Tillamook, OR	Vulnerable populations workshop	15
3/20/2014	Lincoln City, OR	Vulnerable populations workshop	9
3/20/2014	Neskowin, OR	Public Workshop	20
3/19/2014	Newport, OR	Vulnerable populations workshop	28
3/18/2014	Florence, OR	Vulnerable populations workshop	15
3/17/2014	Reedsport, OR	Vulnerable populations workshop	10
3/14/2014	North Bend , OR	Vulnerable populations workshop	16
3/13/2014	Bandon, OR	Vulnerable populations workshop	11
3/13/2014	Bandon, OR	Public Workshop	60
3/12/2014	Gold Beach, OR	Vulnerable populations workshop	6
3/11/2014	Brookings, OR	Vulnerable populations workshop	12
2013			
11/25/2013	Corvallis, OR	OSU, GEO 380 Guest lecturer	45
11/13/2013	Medford, OR	Cascadia Ready of Not - Public Presentation	300
11/13/2013	Medford, OR	First Responder Forum	100
11/14/2013	Grants Pass, OR	Cascadia Ready of Not - Public Presentation	126
11/14/2013	Medford, OR	First Responder Forum	50
11/15/2013	Grants Pass, OR	First Responder Forum	38
10/19/2013	Corvallis, OR	LEGOS, OSU	57
10/17/2013		Great Oregon Shakeout	129,000
10/10/2013	Seaside, OR	NW Association of Industrial Hygienists, Seaside, OR	
10/5/2013	Salem, OR	West Salem CERT	
10/5/2013	Astoria, OR	Oct 5, 2013—CETEEP, Astoria, OR	
10/1/2013	Salem, OR	Candlaria PTA	
9/23/2013	Grants Pass, OR	Anne Basker Auditorium, Grants Pass	120
9/23/2013	Roseburg, OR	Public Safety Building, Roseburg	26
9/20/2013	Grants Pass, OR	Southern Oregon Aspire, Grants Pass	36
9/20/2013	Medford, OR	Medford City Hall	300
9/19/2013	Table Rock, OR	Table Rock Kiwanis	8
9/18/2013	Klamath Falls, OR	Klamath County Commisioners	8
9/18/2013	Klamath Falls, OR	Klamath Community College	10
9/17/2013	Klamath Falls, OR	Klamath Falls Library	38
9/16/2013	Lakeview, OR	Lakeview High School	24
9/12/2013	Seattle, WA	American Association of Engineering Geologists	

Date	Location	Event	Number of Attendees
6/4/2013	Klamath Falls, OR	Klamath County department heads	12
6/4/2013	Klamath Falls, OR	Klamath Kiwanis	24
6/4/2013	Klamath Falls, OR	Roboteers	18
5/21/2013	Salem, OR	City of Salem Department leader meeting	45
5/8/2013	Salem, OR	Roots Academy, Salem	
5/7/2013	Woodburn, OR	Woodburn Kiwanis	
4/19/2013	Salem, OR	Salem City Club	
4/10/2013	Salem, OR	NW Public Power Association	
3/24/2013	Gold Beach, OR	Tsunami Ready Celebration, Gold Beach Event Center	
3/24/2013	Port Orford, OR	Tsunami Ready Celebration, Port Orford City Hall	
3/23/2013	Brookings, OR	Tsunami Prep Talks - Public Presentation, Brookings Elks Lodge	
3/22/2013	Gold Beach, OR	Distant Tsunami Response Training	
3/22/2013	North Bend, OR	Tsunami Ready Celebration	
3/21/2013	North Bend, OR	Tsunami Prep Talks - Public Presentation, Southern Oregon Community College	
3/20/2013	Winchester, OR	Distant Tsunami Response Training	
3/19/2013	Florence, OR	Tsunami Prep Talks - Public Presentation, Florence Library	
3/19/2013	Florence, OR	Distant Tsunami Response Training	
3/18/2013	Newport, OR	Distant Tsunami Response Training	
3/15/2013	Lincoln City, OR	Tsunami Prep Talks - Public Presentation, Driftwood Public Library, Lincoln City	
3/14/2013	Rockaway Beach, OR	Distant Tsunami Response Training	
3/14/2013	Rockaway Beach, OR	Tsunami Prep Talks - Public Presentation	
3/13/2013	Tillamook, OR	Distant Tsunami Response Training	
3/12/2013	Warrenton, OR	Public Library Management Team, Warrenton City Hall	
3/12/2013	Astoria, OR	Tsunami Prep Talks - Public Presentation, Astoria Library	49
3/11/2013	Warrenton, OR	Distant Tsunami Response Training	
3/11/2013	Seaside, OR	Tsunami Prep Talks - Public Presentation, Seaside Library	
3/10/2013	Newport, OR	Japanese Tsunami exhibit at Hatfield Marine Science Center	78
2/11/2013	Newport, OR	Newport Tsunami Trail walk	24
1/30/2013		Association of Public-Safety Communications Officials	50
1/30/2013	Lincoln City, OR	APCO, Salishan, Lincoln City	
1/10/2013	Newport, OR	ODOT Japan Bridge Workshop, Newport	
2012			
12/6/2012	San Francisco, CA	American Geophysical Union Fall Meeting	
11/16/2012	Eugene, OR	Lane County Emergency Prep Workshop	
11/3/2012	Wilsonville, OR	Wilsonville Oddfellows	24
10/23/2012	Salem, OR	Zombie Survival Workshop	36
10/18/2012	Oregon	The Great Oregon ShakeOut	129,000
10/12/2012	Newport, OR	ODOT/Japan Bridge Workshop	
10/11/2012		Oregon Chapter Public Risk Management Association	
9/26/2012	Newport, OR	Hatfield Marine Science Center	48
9/21/2012		Oregon State Board of Examiners for Engineering and Land Surveying	56
7/18/2012	Corvallis, OR	OSU Cascadia Dam Failure Workshop	24
7/17/2012	Portland, OR	USDA Oregon Emergency Board	24
5/31/2012	Coos Bay, OR	Coos Bay Tsunami Drill	200
5/23/2012	Tillamook, OR	Tillamook Tsunami Drill	100
5/2/2012	Washington, DC	American Geophysical Union Science Policy Conference, WA, DC	100

Date	Location	Event	Number of Attendees
3/25/2012	Port Orford, OR	Port Orford Townhall	31
3/24/2012	Gold Beach, OR	Gold Beach Townhall	48
3/23/2012	Bandon, OR	Bandon Townhall	125
3/22/2012	Coos Bay, OR	Coos Bay Rally	235
3/21/2012	Roseburg, OR	Roseburg Townhall	24
3/20/2012	Winchester Bay, OR	Winchester Bay presentation	24
3/20/2012	Reedsport, OR	Reedsport Townhall	51
3/18/2012	Eugene, OR	Eugene Earthquake Townhall	19
3/17/2012	Newport, OR	Newport Readiness Fair	64
3/17/2012	Depoe Bay, OR	Depoe Bay Readiness Fair	40
3/16/2012	Yachats, OR	Yachats Readiness Fair	42
3/16/2012	Toledo, OR	Toledo Readiness Fair	61
3/15/2012	Lincoln City, OR	Lincoln City Readiness Fair	50
3/14/2012	Lincoln City, OR	Cutler City Tsunami Drill	24
3/11/2012	Tillamook, OR	Tillamook Tsunami Rally	200
3/10/2012	Cannon Beach, OR	Cannon Beach Tsunami walk	30
3/9/2012	Seaside, OR	Seaside Tsunami Townhall	41

Source: OEM

Table 5-13. FEMA Mitigation-Related Trainings Offered by OEM 2012–2014

Program	Jurisdiction	Date	Number Trained
2012			
MGT-315 Enhanced threat/risk	Portland	Apr 24-25, 2012	30
MGT-315 Enhanced threat/risk	Portland	May 19-20, 2012	38
MGT-315 Enhanced threat/risk	Portland	Oct 11-12, 2012	30
2014			
AWR-233 Volcano Crisis Awareness Class	Clackamas County	May 21-23, 2014	45
MGT-315 Enhanced Threat and Risk Assessment	Salem, OR	Dec. 3-4, 2014	chuck.cogburn@state.or.us

Source: OEM

Certification also exists for Emergency Managers at both national and state levels, and at full and associate certification levels (http://www.iaem.com/page.cfm?p=certification/intro). There are 16 nationally Certified Emergency Managers in Oregon, including two at the associate level. Nine were certified during the period 2012-2014 (http://www.iaem.com/page.cfm?p=certification/current-cem-aem). Twenty-two people received state certification as Emergency Managers in Oregon during this period (OEM, personal contact). Eight of those also received national certification during this period.

5.7.2 Executive Actions

44 CFR §201.5(b)(4)(ii), A statewide program of hazard mitigation through the development of legislative initiatives, mitigation councils, formation of public/private partnerships, and/or other executive actions that promote hazard mitigation.

The State of Oregon has three key mitigation councils—the State Interagency Hazard Mitigation Team (State IHMT), the Oregon Seismic Safety Policy Advisory Commission (OSSPAC), and the Drought Council, all staffed by the Oregon Military Department, Office of Emergency Management.

Governor Kitzhaber formed the State IHMT in 1997. It typically meets quarterly to understand losses arising from hazards; recommend strategies to mitigate loss of life, property, and natural resources; and develop, update, and maintain the Oregon NHMP.

The Oregon Legislature created OSSPAC via Senate Bill 96 in 1991. Its mission is to reduce exposure to earthquake hazards in Oregon by developing and influencing policy at the federal, state and local levels; facilitating improved public understanding and encouraging identification of risk; supporting research and special studies; supporting appropriate mitigation; supporting response and recovery; and supporting and assisting in the coordination of a grant program for the disbursement of funds for seismic rehabilitation of schools and emergency facilities.

By House Resolution 3 (2011), the legislature directed the Oregon Seismic Safety Policy Advisory Commission (House Resolution 3) to lead an effort for Oregon to plan for a Cascadia earthquake and tsunami. The Oregon Resilience Plan was adopted on February 2013 and addresses the following issues:

- Describes the current scientific research and likely physical effects of a magnitude 9.0 Cascadia subduction zone earthquake and tsunami.
- Assesses the workplace integrity, workforce mobility, and building systems performance needed to allow Oregon's businesses to remain operational following a Cascadia earthquake and tsunami.
- Assesses the unique risks faced by Oregon's coastal communities.
- Examines the main classes of public and private structures considered critical to resilience and sought to characterize the gap between expected seismic performance and desired seismic resilience.
- Assesses the seismic integrity of Oregon's multi-modal transportation systems, with special considerations pertaining to the Columbia and Willamette River navigation channels.
- Investigates the seismic deficiencies of Oregon's energy storage and transmission infrastructure, with a special emphasis on the vulnerability of the state's critical energy infrastructure hub.
- Examines the inherent vulnerabilities of Oregon's information and communications systems and the consequences of service disruptions for the resilience of other sectors and systems.

Reviews vulnerabilities of the pipelines, treatment plants, and pump stations that make up Oregon's water and wastewater systems, and discusses the interventions needed to increase the resilience of under-engineered and antiquated infrastructure at potential failure points.

Senate Bill 33 (2013) established the Oregon Resilience Task Force to "facilitate a comprehensive and robust plan to implement the strategic vision and roadmap of the Oregon Resilience Plan (a product of OSSPAC) for responding to the consequences of naturally occurring seismic events associated with

geologic shift along the Cascadia subduction zone." The Task Force reported to the Legislature on October 1, 2014 (**Appendix 9.2.6**) with a prioritized list of actions to begin implementation of the Oregon Resilience Plan.

The Drought Council was established as a result of a 1988 drought planning effort. It is comprised of state and federal agencies as well as private organizations and is responsible for assessing the impact of drought conditions and making recommendations to the Governor´s senior advisors. The Oregon Drought Plan also established a subcommittee of the Drought Council, titled the Water Availability Committee of Oregon (WACO). It is chaired by the Oregon Water Resources Department and its members include the Oregon Climate Service, Snow Survey Section of the Natural Resource Conservation Service, National Weather Service, Oregon Department of Forestry, U.S. Geological Survey, U.S. Army Corps of Engineers, and the Northwest River Forecast Center. WACO is charged with assessing water availability conditions within Oregon's 14 water availability basins and reports regularly to the Drought Council.

The state also formed and maintains a public-private partnership known as the Oregon Partnership for Disaster Resilience (OPDR). OPDR is a non-state supported coalition of public, private, and professional organizations working collectively toward the mission of creating a disaster resilient state. Developed and coordinated by the Community Service Center (CSC) at the University of Oregon, OPDR employs a service-learning model to increase community capacity and enhance disaster safety statewide. OPDR activities are organized on three levels: statewide, regional, and local (including university campuses). Each level of activity builds on the others, and contributes to a more coordinated and collaborative statewide program.

Oregon Solutions (http://orsolutions.org/about)began with the passage of the state of Oregon's Sustainability Act in 2001. The program uses cutting-edge dispute resolution programs and practices to assist civic leaders in resolving difficult public policy issues. Oregon Solutions also partners with the Governor's Regional Solutions Centers to assist with priority projects where state agency assistance and funding is available and needed. When an issue seems intractable, Oregon Solutions calls on Oregon Consensus to mediate and resolve conflict. Oregon Solutions has been instrumental in resolving natural hazard mitigation issues (http://orsolutions.org/projects):

- Columbia Levee Improvement Project (Ongoing)
- Milton Freewater Levee (Completed)
- Tillamook Basin Flooding Reduction (Completed. Led to Southern Corridor Flow Project.)
- Vernonia Schools (Completed)

5.7.3 Non-Federal Match

44 CFR §201.5(b)(4)(iii), The state provides a portion of the non-federal match for HMGP and/or other mitigation projects.

The State of Oregon provides the non-federal match for projects for which a state agency is the subgrantee or benefits directly from the mitigation project. The state also provides considerable direct technical assistance to local government sub-applicants, especially in the development of benefit-cost analyses that are required for determining mitigation project eligibility under HMGP or other mitigation grants to move forward in the sub-application and review process. In extraordinary circumstances, the

state legislature will provide the non-Federal cost share for a local government project. Such was the case with the Vernonia Schools Acquisition Project that acquired a flood-prone public school campus and built a new school on high ground outside the Special Flood Hazard Area. The Oregon Legislature provided a one-time, non-Federal match contribution of $4 million toward acquisition of the property, including the special costs incurred for environmental and historic preservation compliance.

DLCD has requested the its Technical Assistance Grants (TAG) Program be made available to fund natural hazard mitigation activities. Should this request be approved, grants would provide a portion of the required cost share for FEMA local natural hazards mitigation planning grants.

5.7.4 Building Code

44 CFR §201.5(b)(4)(iv), To the extent allowed by state law, the state requires or encourages local governments to use a current version of a nationally applicable model building code or standard that addresses natural hazards as a basis for design and construction of state sponsored mitigation projects.

The adoption and effective enforcement of building codes are among the most important hazard mitigation tools related to the design and construction of structures for human occupancy. The state building code is composed of several specialty codes (e.g., plumbing, structural, mechanical, elevator, electrical, boiler, and pressure vessel). All buildings in Oregon must conform to the state's codes, which influences the way buildings are constructed with respect to seismic risk, wind, snow, wildfire, and flood hazards. Specifically:

- **NFIP and State Building Codes:** All but two Oregon communities that have a mapped flood risk participate in the NFIP, which sets minimum requirements for new buildings or substantially improved buildings in the communities' Special Flood Hazard Areas. NFIP standards are minimums, and do not always protect properties. Many Oregon communities do require a higher performance standard when building new or elevating exiting structures in the floodplain. In Tillamook County, for example, all new and substantially damaged or substantially improved structures must have their first floor at least three feet above the mapped 100-year base flood elevation. Once a community establishes how high above the base flood elevation first floors must be elevated, state building codes come into play to ensure that the building is constructed according to NFIP standards, such as use of flood resistant materials, anchoring, and installation foundation openings. Commercial buildings must be designed in accordance with Chapter 5 of the American Society of Civil Engineer's Standard 7-05 (ASCE 7-05), or American Society of Civil Engineer's Standard 25-05 (ASCE 24-05).

- **Manufactured Dwelling Installation Regulations:** Manufactured dwellings are particularly susceptible to damage because they are lighter and less resistant to natural forces. Their lower costs also mean that it takes less damage to establish a total economic loss. The state building code requires that manufactured dwellings be elevated and tied down in all designated flood areas and braced for wind in high wind areas, but there are no mandatory tie-down or bracing requirements for earthquakes. Nevertheless, there are standards for commercial seismic bracing systems that are sold for voluntary installation.

- **Seismic Safety and State Building Code:** The state's building code requires that commercial buildings be seismically designed in accordance with the American Society of Civil Engineer's

Standard 7-05 (ASCE 7-05). ASCE 7-05 was developed using FEMA's National Earthquake Hazards Reduction Program (NEHRP) recommended provisions which led to more comprehensive seismic design guidelines. One and two family dwellings and townhouses may follow a prescriptive path for construction, which accounts for regional seismic differences.

- **Local Wildfire Hazard Mitigation Provisions:** Local jurisdictions may adopt provisions addressing wildfire hazard mitigation in conjunction with criteria established by the Oregon Department of Forestry. The provisions address issues such as combustibility of roofing and premises identification.

- **Wind:** The state's building code requires that commercial buildings be designed in accordance with Chapter 7 of the American Society of Civil Engineer's Standard 7-05 (ASCE 7-05). Rood uplift standards must be applied for residential structures where winds exceed 85 mph as defined by basic wind speeds for a 50-year mean recurrence interval (published in the residential building code).

- **Snow:** The state's building code requires that commercial buildings be designed in accordance with Chapter 7 of the American Society of Civil Engineer's Standard 7-05 (ASCE 7-05). Residential buildings must be specifically engineered in areas with ground snow loads greater than 70 pounds per square foot (http://snowload.seao.org/lookup.html).

5.7.4.1 Retrofitting and Rehabilitation

Depending on the nature of the risk and the expected performance of the buildings and systems under defined hazard conditions—especially where the risk may not be severe—it may or may not be cost effective to retrofit or rehabilitate buildings or infrastructure. For example, it may not be cost-effective to undertake a seismic retrofit of a public facility in the tsunami inundation zone where a newly constructed, seismically-sound replacement facility out of the tsunami inundation zone makes sense as a better, long-term investment and totally avoids the tsunami hazard.

An incremental approach to hazard mitigation can be effective over the long-term by using ongoing maintenance and capital funds to reduce vulnerabilities. Such measures may be done voluntarily or may be contained in codes or regulations governing remodeling or sale of properties. Such is the case with seismic retrofit projects that are rarely undertaken without consideration for other actions such as deferred maintenance, energy upgrades, and improved facility access.

5.7.4.2 Removing Buildings from Harm's Way

Especially with respect to the flood hazard, although not exclusively so, rather than attempting to control the hazard, there is now an emphasis on moving structures—especially homes—out of harm's way by elevating them well above flood danger, relocating, or even acquiring and demolishing the structure so only open space remains in perpetuity. The National Flood Insurance Reform Act of 2012 and The Sandy Recovery Improvement Act of 2013 emphasize, streamline, and encourage—with FEMA grant funding—to remove, via acquisition, properties that have a repetitive history of flood losses. Oregon's priority is to use hazard mitigation funding from a number of federal programs, local governments and the private sector to accomplish this work with respect to the flood hazard. These elevation, relocation, or acquisition efforts are especially appropriate for homes that were built in

floodplains prior to the establishment of the National Flood Insurance Program (1968), which have sustained repetitive flood losses over the years.

Oregon has also embraced the concept of moving buildings out of harm's way following disasters. For example, instead of only making repairs to flood-damaged buildings, opportunities to elevate, relocate, or acquire buildings are pursued soon after the flood waters recede to break the cycle of rebuilding and flooding again and again. When flood-prone homes are acquired or relocated, the once-developed land is returned to open space uses in perpetuity by means of deed restrictions. This removes the possibility of future disaster losses to buildings at that location. Since December 2007 (DR-1733) there have been a total of 42 residential elevation and 37 residential acquisition projects completed using FEMA mitigation grant funding and NFIP funds in the City of Vernonia alone. Additionally, six public and commercial properties have been acquired and one commercial property protected by a floodwall. The Vernonia mitigation project has systematically mitigated essentially all of the properties that were substantially damaged by flooding in the December 2007 event.

In some cases, acquisition or relocation of a building might be pursued to mitigate for other hazards, such as stream bank or coastal erosion, or its location in an area especially vulnerable to debris flows.

5.7.4.3 Structural Projects

Measures that are intended to control the hazard so that it does not reach or damage developed areas are often called "structural." These measures are structural because they involve the construction of facilities. However, many structural projects are expensive to construct and maintain, and they may have other shortcomings such as environmental considerations and recurring maintenance costs. On the other hand, structural projects are occasionally the most cost-effective way to protect an area, especially a densely developed area, and can sometimes serve several objectives. Statewide there are numerous structural projects that have been constructed over the course of the past century. Some are for flood control and some are multi-purpose, such as Detroit Dam on the Santiam River, which was built for flood control and power generation as well as irrigation water and recreational purposes during the summer months. Structural control projects also include dike and levee facilities that protect communities and infrastructure from flooding. As structural control projects, levees require routine maintenance to maintain their effectiveness and if not inspected and certified, flood insurance rates can increase for the areas they protect.

5.7.5 Critical/Essential Facilities

44 CFR §201.5(b)(4)(v), A comprehensive, multi-year plan to mitigate the risks posed to the existing buildings that have been identified as necessary for post-disaster response and recovery operations.

The 2009 NHMP identified an action to develop a comprehensive multi-year plan to mitigate the risks posed to existing buildings that have been identified as necessary for post-disaster response and recovery. This has been partially completed through the statewide seismic needs assessment that assessed the earthquake risk to K-12 schools and critical facilities at the local level, completed and issued by DOGAMI in May 2007. The "Oregon Seismic Needs Assessment: Education & Emergency Facilities Report" provided the impetus for the state legislature to authorize funding for the **Seismic Rehabilitation Grant Program**. The purpose of the program is to retrofit first responder facilities, public

schools, and hospitals so they will withstand the design earthquake event and remain functional for use during response and recovery.

5.7.6 Integration with Post-Disaster Recovery Operations

44 CFR §201.5(b)(4)(vi), A comprehensive description of how the state integrates mitigation into its post-disaster recovery operations.

The State and local communities integrate mitigation into post-disaster recovery operations by taking advantage of Hazard Mitigation Grant Program (HMGP) dollars that become available after presidentially declared disasters. See **Section 0** for a summary of HMGP project status.

State post-disaster mitigation planning and project activities following disasters are an integral component of OEM's mission. OEM's Mitigation and Recovery Services Section provides oversight and administration of financial services and related funding that is passed through to local governments. Additionally, the Mitigation and Recovery Services Section manages disaster recovery activities for state and local governments in the event of a devastating emergency or disaster. Specifically, the Section Director, SHMO, Alternate SHMO, Facilities Engineer (Public Assistance Officer), Seismic Grants Coordinator, and financial support staff work together on post-disaster mitigation grant programs and project activities. Although OEM has limited staff support available for post-disaster mitigation planning and project implementation activities, the state is able to effectively secure and manage FEMA's HMGP grants. **Table 5-6** shows the status of the current HMGP grants. The state's most current HMGP disaster (DR-4169) remains open for new sub-applications through April 3, 2015. HMGP disaster DR-4055 was the state's first disaster to be included under the legislative changes authorized by the Sandy Recovery Improvement Act (SRIA) of 2013 that has generally streamlined the application, review, approval, and funding process. SRIA will greatly impact roll-out of HMGP activities for future disaster declarations with an emphasis of expediting all phases of the HMGP process so mitigation projects can be implemented much more quickly and efficiently from the onset of the declaration to availability of Federal mitigation project funding.

5.7.6.1 Expediting the HMGP Process

SRIA provides the following opportunities to expedite the HMGP process for future disaster in Oregon:

- **Streamlining Environmental and Historic Preservation (EHP) reviews including Section 106 Consultation.** The Oregon Office of Emergency Management developed and hosts an online EHP guide, "Emergency Management for Natural, Cultural, and Historic Resources: An Oregon Resource Dashboard" that provides a compendium of resources designed to streamline EHP processes both pre- and post-disaster. The EHP Resource Guide is intended to be updated with current information, essential for those who access the website. This page includes local, regional, and national level information related to Natural, Cultural, and Historic Resources (NCHR) protection requirements, best management practices, as well as primers for caretakers of these resources. This information is geared toward assisting emergency managers as well as people or agencies charged with protecting and preserving collections, sites, and artifacts in the short and long term.

OEM plans to continue working with its local, state, and national partners to increase the awareness of natural, cultural, and historic resources (NCHR) and seek additional opportunities to protect them through existing and unique site-specific plans and actions. In year 2015, OEM intends to work with Oregon State Parks and Recreation to identify and publish NCHR inventories and resource specific information in a geographical information system map presentation (RAPTOR) that is managed by OEM for use by emergency managers. This information will be available and accessible to emergency managers during their planning, response, and recovery work to help guide their decision making and maximize protection and minimize impacts to NCHRs. Making this information available in a format that is simple to access and use, in a system that is already in place, should lead to a higher level of awareness and consideration of these resources in all phases of the disaster planning cycle. Today, NCHRs are included in the RAPTOR training being delivered to emergency managers to ensure they are aware of existing data sets that can assist them in their decision making process.

- **HMGP Program Administration by State.** This SRIA provision allows for states to assume more responsibility for HMGP activities and to expedite project approvals and delivery of funding resources. Currently, Oregon does not have sufficient staff to assume more state oversight of HMGP grant administration. Rather, Oregon's model to expedite HMGP administration will rely on working closely and efficiently with FEMA mitigation staff during JFO operations. This model was used during DR-4055 JFO operations and was successful in securing HMGP sub-grant approvals and funding obligations during the short time the JFO was operational.

- **HMGP Advance Assistance Funding.** SRIA also gives FEMA the authority to provide states up to 25% of the amount of estimated Hazard Mitigation Grant Program (HMGP) costs in advance of incurring eligible costs. The purpose of Advance Assistance is to provide resources to develop mitigation strategies and obtain data to prioritize, select and develop complete HMGP applications in a timely manner. FEMA expects States that receive Advance Assistance to submit complete project applications up to or over the HMGP ceiling by the nominal one-year application deadline.

- OEM also assigns staff liaisons to specific counties to support operations both during and after disasters. These "County Liaisons" provide valuable input into early implementation of HMGP mitigation strategies. By working closely with the state's Public Assistance Officer, the state is also able to identify mitigation opportunities immediately following a disaster declaration that can be implemented quickly as a component of Public Infrastructure Assistance (Section 406) disaster assistance. As a matter of standard protocol during JFO operations, all Public Assistance Project Worksheets (for permanent repair work) are reviewed for both Sections 406 (Public Assistance) and 404 (HMGP) mitigation where there are opportunities to mitigate undamaged components of a companion 406 mitigation project.

5.7.6.2 Exemplary Projects

The following projects describe successful use of grant funding to mitigate future hazard losses. These projects are still ongoing, to be completed in the near future. Completed projects are described in **Section 3.3.5**, Mitigation Successes.

DR-1964—City of Newport: Tsunami Safe Haven Hill (Tsunami Life Safety Mitigation)

The entire Pacific Northwest coast is at extremely high risk from tsunamis generated by very large magnitude earthquakes on the Cascadia Subduction Zone. However, the life safety risk is most extreme for communities where accessible natural high ground safe areas (safe havens) are not reachable before the first arrival of tsunami waves. The South Beach community within the city of Newport faces an extreme life safety risk from tsunamis because:

- Virtually the entire community is at very low elevations and located within the mapped tsunami inundation zones.
- Safe Haven Hill is the only high enough elevation safe area that is reachable within the very short time period of less than 30 minutes between the end of earthquake ground shaking and tsunami arrival.
- Safe Haven Hill has very poor access with very steep heavily forested slopes and only one marginal pathway on the opposite side from the highest population area.
- Without a suitable, accessible safe area, the death toll from the next major tsunami will be catastrophic, with over 1,000 deaths possible.

The HMGP mitigation project is to “retrofit” the existing natural hill feature to improve the existing safe area—the top of Safe Haven Hill—by making the site accessible and thus reachable by many more people during the short time period between a major earthquake on the Cascadia Subduction Zone and the first arrival of tsunami waves in South Beach. The project scope includes the following elements to improve access to the safe area on Safe Haven Hill:

- Establish a cleared safe area at the top of Safe Haven Hill.
- Improve the existing crude trail on the north side and the existing gravel path on the southwest side of the hill and stabilize these pathways to prevent failure from slumping/sliding during strong earthquake ground shaking preceding tsunami arrival.
- Add a stairway on the south side of the hill to expedite access to the safe area for people approaching the hill from the south.
- Add a sidewalk on the east side of the hill (west edge of Highway 101) to ensure safe access for people coming from the east.
- Improve access, visibility and awareness of the tsunami safe area with path lighting and signage.
- Install a disaster supply shed in the safe area.

With a detailed project feasibility study, geotechnical analysis, cultural resources survey and benefit-cost ratio in double digits based on life-safety considerations, this project (when completed in summer 2015) will provide a “high ground option” for the community to significantly reduce loss of life to the tsunami hazard.

DR-4055—City of Portland - Seismic Retrofits for Single-Family Homes Demonstration Project

The approved mitigation project consists of earthquake structural retrofits for single-family, wood-frame homes with cripple walls and/or sill plates that are not bolted to the foundation. This project was identified as an opportunity for the city to demonstrate the implementation of low-cost seismic mitigation treatments to residential homes that will significantly reduce catastrophic structural failure and would otherwise make a house unlivable.

Based on a sample of 36 previously completed seismic retrofits (sill plate bolting and/or cripple wall bracing) in Portland, the average retrofit cost per home is $4,967, with a range from $2,880 to $19,495. Most of the retrofit costs for these 36 homes fall between $3,000 and $7,000, with only one home below $3,000 and only four above $7,000. The retrofit costs vary with the size of the home as well as on other factors including which retrofit elements are needed for a given home, ease or difficulty of access to the buildings elements being retrofitted, and the extent (if any) to which additional foundation upgrades need to be done for some homes.

Most wood-frame single-family homes perform relatively well in earthquakes. However, homes with cripple walls and/or unbolted sill plates are a strong exception: homes with these types of construction details are highly vulnerable to extensive or complete damage in earthquakes by one or more of the failure modes. Based on the calculated benefits of the mitigation treatments and their costs, benefit-cost ratios of between 2 and 5 were calculated for this project. Thus, these retrofits are highly cost effective because:

- They address major seismic deficiencies in single-family wood-frame homes built before the mid-1970s;
- The retrofits are highly effective in reducing seismic risk; and
- The retrofit costs are very low relative to building values.

Another aspect of this project creates opportunities to include energy efficiency upgrades (like improved insulation) with the seismic retrofit at the same time to leverage the invasive nature of both retrofits.

DR-4055—Seal Rock Water District—Water System Intertie Project

The Seal Rock Water District is located in Lincoln County and serves a narrow strip of coastal land approximately 15-mile long along Highway 101 between the cities of Newport and Waldport. The District serves a population of about 4,300 people with both residential and commercial water service through approximately 2,400 meters. Because the sole source of Seal Rock's water supply is provided by the City of Toledo water system, any natural hazard event which interrupts the water supply from Toledo for durations long enough to deplete Seal Rock's limited in-system storage will result in complete loss of water supply to all of Seal Rock's customers. During the January 2012 disaster DR-4055, mudslides caused damage to facilities under the jurisdiction of the Seal Rock Water District. An area of South Bay Lane, a Lincoln County road, slumped and slid causing damage to a section of PVC water transmission line located in the south shoulder and ditch of the roadway. The damaged line was repaired and services restored under FEMA's Public Assistance program. During winter storms, this

transmission line has a history of repetitive failures from landslides at several locations. This critical transmission line is also subject to failures in earthquakes.

Seal Rock Water District initially considered mitigating this section of water and other undamaged sections of water line by providing better protections from mudflows and landslides. Based on an analysis of the disturbed area and proposed project costs, it simply would not be a long-term, cost-effective solution to mitigate much of the water delivery line. Given these conditions in the Toledo water system, unusually long duration loss of potable water service in the Seal Rock water system appears virtually inevitable in future disaster events. Instead, Seal Rock Water District proposed a much more comprehensive mitigation project that would tie together two independent water systems providing each one back-up if the other were to fail. The proposed project brings together the City of Newport municipal water system and the Seal Rock water system via an intertie that has pressure controls and back-up emergency power. A detailed benefit-cost analysis of the project intertie delivered a conservative lower bound ratio of 1.95. At the time of this plan update, the project is under FEMA's review with construction planned for the summer of 2014.

Oregon Solutions Team—Southern Flow Corridor

Mitigation work in the Tillamook area related to the Tillamook Bay Repetitive Flood Loss Properties Mitigation Success (**Section 3.3.5**) continues through Oregon's Solutions Team Southern Flow Corridor—Landowner Preferred Alternative Project (SFC-LPA). Oregon's then-Governor Kulongoski designated this area as an Oregon Solutions project in 2007. The purpose of this project is to "remove manmade impediments to flood flows to the maximum extent possible in the lower Wilson River floodplain" by "extensive removal of levees and fill." New tidal dikes will protect adjacent private lands from inundation of daily tides, and areas outside the setback levees will be restored as tidal marsh. Phase 1 of the project for permitting, design, baseline monitoring, EIS, and land/easement acquisition is scheduled from October 2014 through October 2015. Phase 2 construction from May to November 2016, and Phase 3 post-project management plan revision and monitoring will begin in October 2017. Total project costs are estimated to be $9.4 million. For more information visit http://tillamookoregonsolutions.com/.